

# THE MEDICAL JOURNAL OF AUSTRALIA

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SYDNEY: SATURDAY, OCTOBER 8, 1927.

No. 15.

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# MENSTRUAL BLEEDING AND THE FUNCTIONS OF THE CORPUS LUTEUM.<sup>1</sup>

By J. BERNARD DAWSON, M.D. (London),  
F.R.C.S. (England),

Honorary Assistant Gynaecologist, The Adelaide Hospital.

THE human function of menstruation, its normality, its derangements and its physiological cessation during pregnancy and at the menopause play so great a part in gynaecological studies and practice that every effort is necessary to elucidate and understand the problem. It is a subject of many facets; year by year new information emerges from the laboratory and the hospital. Some of this does not stand the repetition or experience, but the assumption grows more certain that the ovary and its cellular elements are only a part of an endocrine orchestra, the full diapason of which we only dimly comprehend.

I recently had two opportunities of removing the *corpora lutea* from the ovaries of young women whose menstrual functions were unaffected by general or local disease.

This clinical experiment has been done before and the sequelae of it were carefully investigated and considered by Beckwith Whitehouse. My experiments along similar lines yielded like results.

My patients were a single girl, nullipara, aged twenty-one years, and a woman who had had two children, aged thirty-seven years. They were both operated upon for pain which proved to be due to morbid appendices, the pelvic organs being healthy. From both at the time of the operation the ripening *corpus luteum* was carefully excised without rupture of any younger follicle. They both menstruated normally on February 14. The operation of the older patient was performed on March 2 and that of the younger took place on March 3.

Thirty-six hours after their operations they both menstruated in a normal manner and with their accustomed premonitory symptoms. In both cases the operation was performed shortly after ovulation and the young *corpora lutea* were easily identified for removal. Had there been no operative procedures the patients would have menstruated on March 14; in both cases this menstruation failed to appear.

Menstruation was therefore looked for about April 1, that is four weeks from the date of the artificially induced period. Again the menstrual flow failed to appear in either case. Both patients eventually menstruated normally approximately eight weeks from the date of their preoperative catamenia. The younger patient on April 7 and the older on April 10. They both, in fact, returned to the menstrual rhythm pertaining prior to their operations.

The artificial destruction of the *corpus luteum* precipitated the menstrual flow due on March 14, but did not disturb the old or establish a new cyclic rhythm of events.

I have mentioned this at the outset, as it is the slender text upon which a rather lengthy sermon is based.

Many attempts have been made to answer the questions:

1. What is menstruation?
2. What controls it?
3. What is its relationship to ovulation and pregnancy?

The great amount of research that has been done upon these questions during the last twenty years, has not yet clearly answered them, but it is possible by winnowing the information gathered to reach certain conclusions that at least give us some insight into the processes at work.

The elementary fact that the removal of active ovarian tissue by surgery or disease terminates menstruation, directs attention to the ovary as a controlling organ.

It has been suggested that ovariectomy so interferes with the blood supply of the uterus that atrophy and afuction follow from that cause. That this is erroneous is shown by the fact that successful ovarian grafting will maintain the menstrual rhythm and flow.

It seems clear then that the ovaries produce a substance or substances that are responsible for the menstrual function of the uterus. It is essential that the ovary shall first be considered.

## Ovary.

The ovary contains three prominent extremely active structures that undergo rhythmical changes.

Each of these illustrates the cycle of function of all organic matter. They are born, mature and die. They are: The interstitial cells, the Graafian follicle, the *corpus luteum*.

## The Interstitial Cells.

For many years controversy raged round the question of the presence or otherwise of interstitial cells in the human ovary. They had been clearly demonstrated in the lower types, in some, notably the rabbit and the bat, these cells assumed such proportions and arrangement as to merit the title "interstitial gland." In 1902 Limon published an accurate description of the ovarian interstitial cells. He maintained that they arise from the *theca interna* of the Graafian follicle, that they contain fat and that they have a secretory function. Cohn in 1903 and Fraenkel in 1905 confirmed these observations except that the latter declined to attribute any important function to these cells on the grounds that they are not present in all species and that in the same species they vary considerably in amount. In 1906 Seitz pointed out that during pregnancy Graafian follicles ripened, but did not rupture. They undergo atretic changes; the *theca interna* cells proliferate to form the interstitial cells which are found in great numbers during pregnancy.

In 1907 Wallart examined material removed from bodies of all ages from an eighteen weeks foetus to a woman ninety-one years of age. They are numerous before and up to puberty and they are abundant during pregnancy.

Although these views have met with opposition, notably from Lane Clayton and Louise McIlroy, it

<sup>1</sup>Read at a meeting of the South Australian Branch of the British Medical Association on August 25, 1927.



is now generally accepted that these cells arise from the *theca interna* cells of the follicle. Wilfred Shaw has recently published an article describing fully the results of careful investigation of ovaries obtained from seventy cases by operation or *post mortem* of all ages from fetal to senile life. Many thousands of sections were cut and the following conclusions reached:

1. Paraffin imbedded specimens do not show the cells clearly as the lipid contents are removed. Frozen sections stained with Scharlach R, Sudan III or Nile blue sulphate give preparations that bring out distinctly the relationship of the interstitial cells to the follicle.

2. The interstitial cells are invariably derived from the *theca interna* cells of follicles undergoing atresia and that they proliferate centrifugally.

3. They are also found in small numbers in the periphery of a degenerating *corpus luteum*.

4. That the shape of the cells, their protoplasmic granules and the presence within them of minute globules of fat all point to some secretory function.

5. They occur at all ages prior to the menopause. They have been found in fetal ovaries at the twentieth week. After birth the number increases reaching its maximum during the child-bearing period. After the menopause no more are produced, in the senile ovary none can be found. Shaw found no evidence of a prepubertal increase in the number of interstitial cells.

#### *The Graafian Follicle.*

The necessity of grasping fully the relationship of the component parts of the Graafian follicle is my only excuse for inflicting upon you such elementary information, but may I ask you to recall the main features of this important structure.

The mature ovisac is enclosed in a connective tissue sheath of which two layers are usually described; an outer one of rather condensed connective tissue and an inner of younger and more vascular connective tissue. These are known respectively as the *theca externa* and *theca interna* and are both derived from the stroma of the ovary. Within these are several layers of granular cubical epithelium known as the *membrana granulosa*. In one place this layer is thickened into a mass of cells enclosing the oocyte.

During maturation of the follicle, either by transudation or secretion of cells, an accumulation of fluid occurs until a relatively large portion of the ovisac is filled with this *liquor folliculi*. We are not concerned at the moment with the oocyte itself, but I should like to remind you that when rupture and dehiscence occur, the oocyte escapes, carrying with it a coat of *granulosa* cells known as the *corona radiata*.

After rupture of the ovisac it partially collapses and is filled with an effusion of blood which clots and plugs the ruptured wall. The cells of the *membrana granulosa* very rapidly proliferate and become loaded with the characteristic yellow lipid material. This rapidly increasing mass of cells, confined within the follicle, is thrown into convolutions divided by connective tissue septa. The cen-

tral blood clot shrinks and becomes organized into a tiny core of connective tissue.

Thus is formed the *corpus luteum*.

Shaw has shown that from the cells of the *theca interna* of the mature follicle cells, similar to but distinct from the lutein cells proper, develop. These are the interstitial cells of the ovary that persist until and after the *corpus luteum* has fully degenerated into a *corpus albicans*. They are sometimes called the paralutein cells, but the terms are synonymous.

In the fetal ovary at the time of birth there are a large number of young follicles, estimated at 100,000; of these most are doomed to atretic changes and probably not more than about 400 eventually mature and liberate an oocyte. Shaw, however, has also shown that interstitial cells develop from the thecal cells of follicles that do not mature and which are cut off in their infancy or youth by atretic changes. From this it follows that interstitial cells are found in ovaries before and after birth and before maturation and ovulation occur.

The question that now arises, is what part do these varied structures play in the initiation and maintenance of the function of regular menstrual bleeding. Many experiments upon lower species and a few upon human beings have been carried out and the results can be dovetailed together like the pieces of a jigsaw puzzle to construct a fairly consecutive if incomplete story. Since the interstitial cells appear before the mature follicle and the *corpus luteum*, these should be considered first.

#### *The Function of the Interstitial Cells.*

A study of the prepubertal ovary shows that although there are numerous young and also mature Graafian follicles present, ovulation never occurs and therefore no *corpora lutea* are found nor are any lutein cells to be discovered. The follicles, some in the stage of adolescence and others mature, undergo atretic changes; the *membrana* cells and oocyte degenerate whilst from the cells of the *theca interna* interstitial cells develop in considerable numbers. It is difficult to believe that these numerous follicles undergo atresia with its subsequent development of interstitial cells for no purpose.

In the prepubertal ovary there are: Follicles that atrophy as soon as mature, follicles that abort before maturity, abundant interstitial cells which from their structure and contents clearly have a secretory function, an absence of lutein cells.

In this respect it is interesting to note that in 1912 Van Stricht demonstrated in the bat, an animal that develops abundant interstitial cells, the successive stages of the formation of clear droplets within the fatty globules of the cells. These passed out of the cells into the intercellular spaces, thence into the lymphatics and so to the general circulation.

It is now generally accepted that these cells control the development of the secondary sex characteristics. In some way upon them and their secre-

tions depend the proper and normal development of the female type of pelvis, the narrow shoulder girdle, the mammary changes, the distribution of hair and fat and probably the psychological distinctions of the female. Suggestive evidence of this view is derived from the study of castrated animals and gonadal grafting.

Tandler and Gross have carefully studied the characteristics of the Skopeks, a Slavonic religious sect that castrate their male children. The adult Skopek has axillary and pubic hair of the female type, the distribution of the fat around the breasts and hips is similarly feminine, they have a very sparse growth of hair of the face and the muscular changes of the larynx do not occur.

Studies of females from whom the ovaries have been removed at an early age, show a lack of development of female characteristics.

It would seem that both castrated males and ovariectomized females approximate to a neutral indeterminate type and that the added stimulus or inhibition of the gonad is necessary to determine the true complete sex differentiation.

Steinach and Moore transplanted ovaries into young castrated males and found that some acquirement of female traits followed; it has indeed been demonstrated that after such an experiment hypertrophy of the mammary glands of the male host occurs and a true secretion of milk in such quantity that he is able to adopt offspring.

It is very instructive to follow the fate of such transplanted ovaries; it is found that for a time ovulation and lutein formations regularly occur, but eventually this ceases and the follicles become atretic with the usual development of abundant interstitial cells. It is supposed that, the egg-producing activity of the ovary being useless, the gland reverts to the prepubertal type with atretic follicles and interstitial cell formation and that the development of feminine sex characteristics in the male host is due to these cells. It has also been demonstrated that exposure of females to Röntgen rays causes degeneration of the follicular apparatus, but an accentuated development of interstitial cells. Young females to whom the correct dosage of rays has been administered show a remarkable mammary enlargement with true milk secretion.

The ovaries of such animals are found to contain no normal follicles or *corpora lutea*, but masses of proliferated cells.

It may be regarded as certain that the youthful ovary is responsible for the physiological changes known as secondary sex development and that this is due to the activity of the interstitial cells. There is apparently an asexual embryonic form, the somatic cells of which come at an early age under the influence of the germ cells, the sex of which has been determined by chromosome constitution. This influence decides the development of the secondary sex characteristics.

How early this takes place can be judged from the fact that Fehling recognized the female character of the pelvis of fetuses at the twentieth week in the

ovaries of which no structure other than the interstitial cells could be found.

#### *The Function of the Graafian Follicle.*

During fetal and prepubertal life the follicles continually approach maturity only to become atretic and initiate the formation of interstitial cells. At the age of puberty a change takes place and certain of the follicles mature and rupture, yielding their oocytes to their future fate of fertilization or oblivion.

Whether the emancipated ovum is to achieve its proper destiny of reproduction or merely to disappear in disappointed sterility, seems for a time to be a matter of indifference to the uterus. In either case upon ovulation occurring regular changes take place in the endometrium which undergoes a hypertrophic preparation for pregnancy; if the ovulation proves a sterile one, menstruation takes place.

Although with puberty the function of ovulation is established, many follicles continue to become atretic and the production of interstitial cells goes on throughout the period of sexual activity, ceasing only with the menopause. Each follicle contains an oocyte, a varying quantity of *liquor folliculi*, the *membrana granulosa* cells and the inner and outer theca of connective tissue.

The rôle of the oocyte is well known and outside the scope of this paper.

The part played by the *theca interna* in the production of interstitial cells has already been dealt with.

The *membrana granulosa* cells of the ruptured follicle rapidly proliferate to form the *corpus luteum* in the manner already described. An exception to this statement is that some granulosa cells forming the *corona radiata* escape with the oocyte. It is probable that the *corona radiata* is a mere accident of dehiscence, but a suggestion, to be mentioned later, has been that they have an active part to play. The *liquor folliculi* has been the focal point of long discussion. It is unknown whether it is a transudation product or a secretion of *membrana granulosa* or inner thecal cells.

A series of investigations has been carried out upon the phenomena of œstrus. Stockard and Papanicolaon investigated the œstrous changes in the genitalia of the female guinea pig. Long and Evan applied the method to the correlation of the œstrous phenomena in rats. They showed that during the period of œstrus, the epithelium of the vagina becomes greatly thickened and cornified. It is possible to detect this change by examination of smears of vaginal secretion and by comparison with non-œstrous controls. Allan and Doisy collected from sows *liquor folliculi* with probably some granulosa cells and occasional ova. This they injected subcutaneously into spayed rats, producing thereby typical œstrus indicated by vaginal smears, mating phenomena and successful coitus. Further an active hormone was extracted from the liquor and produced the same results.

These experiments suggest that the *liquor folliculi* has an important and active rôle in the cycle of sexual phenomena in the female.

Beckwith Whitehouse has attempted the same manoeuvres in human beings, injecting intravenously liquor collected from human ovaries. His results were completely negative, no change relating to the vagina, uterus or menstrual function being noted. This negation is by no means conclusive as questions of dosage and the time of collection of the liquor as related to menstruation of the donor make such an isolated experiment of little value as proof.

In parentheses it is interesting to note that this method of examining vaginal smears from rats has been employed to test the potency of extracts made from whole or dissected ovaries.

Apart from the doubtful activity of the liquor it would seem that the developing and mature follicles are concerned with two things: the development, protection and ultimate liberation of the oocyte and the production of interstitial cells. Not so the post-mature follicle which after rupture becomes an organ of great importance, the *corpus luteum*.

#### *The Function of the Corpus Luteum.*

On section a mature *corpus luteum* has a striking resemblance to the suprarenal gland, the cells in the outer portion being arranged in columns between which run blood vessels, lymphatics and nerve fibres. Recently French anatomists have emphasized the similarity by pointing out that the *corpora lutea* and suprarenal glands are developed from closely related *Anlagen* and that they contain apparently identical lipid material.

When pregnancy does not occur, the *corpus luteum* reaches its full development in about three weeks and then rapidly shrinks, so that it is quite small by the time the next follicle ruptures, although its yellow colour is recognizable for another month. If pregnancy occurs, it grows to a much greater size and reaches its maximum about the third month and at the time of labour it is still as large as the *corpus luteum* of menstruation. It does not completely disappear until three months after delivery. During the past twenty years much work has been done to discover the function of the *corpus luteum*. These investigations usually consist of observing the effects of injection of extracts of *corpus luteum* or the effects of its ablation.

The more important of these are as follows:

In 1911 Loeb, working with guinea pigs, showed that extirpation of the *corpus luteum* materially shortened the interval between ovulations. Pearl and Surface by injecting *corpus luteum* extract into fowl prevented ovulation.

Gustav Born first suggested that the *corpus luteum* might produce a secretion concerned with the fixation of the ovum in the uterus. In 1901 to 1903 Fraenkel removed the ovaries or cauterized out the *corpora lutea* of rabbits from one to six days after coitus. In every case he found that the procedure had caused non-fixation of the ova or abortion. These results were confirmed by Marshall and Jolly working with dogs. They extirpated the ovaries at intervals of from three days to four weeks after impregnation. Abortion occurred in every

case save one and in that it was found that a portion of an ovary containing lutein material had been overlooked. Analogous results have followed the surgical interference with the ovaries in human beings and, although obviously it is not easy to obtain sufficient clinical information to establish a series, many isolated experiences suggest that the data of the laboratories can be transferred to the study of human beings.

It was Fraenkel also who first noticed the relationship between the *corpus luteum* and menstruation. Destruction of the *corpus luteum* disturbed the rhythm of menstruation and in pregnancy caused abortion. He deduced that the function of the *corpus luteum* was to maintain nutrition of the uterus and prepare the endometrium for the reception of the ovum. If pregnancy did not occur, the *corpus luteum* degenerated and the endometrium underwent anabolic changes leading to destruction.

In 1909 Bruin tied the *vas deferens* of a buck rabbit and allowed him to have coitus with a doe. Although conception was impossible the ruptured follicle developed into a *corpus luteum* and considerable growth took place in the mammary glands.

O'Donoghue mechanically burst the ripe follicles of rabbits during the third and fourth days of oestrus. He found that *corpora lutea* were usually but not always formed. When no *corpora lutea* were formed, there was no mammary development.

Many other observers in Germany and France confirm Fraenkel's original observation and agree that: "Ovulation occurs during the intermenstrual period and that an active *corpus luteum* accounts for the onset of menstruation."

Schroeder showed that when endometrial activity begins in the premenstrual period a young *corpus luteum* is present which matures before active menstruation begins and degenerates about the period of endometrial breakdown. Wilfred Shaw carried these investigations still further and showed that ovulation takes place the thirteenth and seventeenth day of the menstrual cycle and that proliferation of the endometrium continues until the nineteenth day, the maturation of the *corpus luteum* being very rapid. Shaw also noticed that premenstrual changes in the endometrium start about the fourteenth day or immediately after ovulation and that when fully developed the endometrium resembles the decidua of an early pregnancy.

The correlation between these endometrial changes and the *corpus luteum* was carried still further by Loeb who tied the Fallopian tubes of guinea pigs and thus prevented pregnancy. After oestrus, coitus and ovulation he found hypertrophy of the endometrium. He also succeeded in substituting foreign bodies and other mechanical stimuli for the presence of the ova in the uteri. He found that if such artificial stimuli were applied to the uterine mucosa during the existence of an active *corpus luteum*, a material placenta was formed at the point of excitation. This artefact became necrotic within twenty days, but extirpation of the *corpus luteum* prevented its full development and induced early and extensive degeneration and



necrosis which was largely due to hæmorrhage. If, however, an artificial placenta is produced in one horn of a uterus whilst the other is normally pregnant, the artefact may persist throughout pregnancy.

*The Effects of Removing the Corpus Luteum from the Ovary of a Healthy Non-Pregnant Woman.*

My own experiments, detailed above, were incomplete ones, but they showed that an untimely menstrual period occurred within forty-eight hours of the operation. I was unable to investigate the menstrual discharges or the state of the endometria. Whitehouse who previously carried out the same operation, investigated the results very fully and his findings are of great interest and importance. His patient was a *primipara*, aged twenty-three, and her menstrual history was perfect, of the usual twenty-eight day type. Her last period occurred on May 23, 1926, and lasted until May 26. Her next two periods were therefore due on June 20 and July 18. Laparotomy was performed on June 8, sixteen days after the May menstruation. The pelvic organs were healthy and a large *corpus luteum* was carefully excised entire. Great care was taken to avoid trauma and no follicle was ruptured. Twenty-four hours later she had her usual premonitory symptoms of menstruation and thirty-nine hours after the operation her menstrual flow started. Thirteen hours after the establishment of the flow she was anaesthetized, the vaginal contents were removed; with great care and without dilatation a sample was obtained of the uterine contents and finally scrapings obtained from the endometrium.

The vaginal discharge had all the characteristics of normal menstrual blood, being dark in colour, hæmolytic well marked, absence of clot and a quantity of uterine gland secretion. The microscope revealed abundant polymorphonuclear cells, fragments of degenerated uterine stroma and "ghosts" of endometrial epithelium and glands.

Examination of the uterine contents showed that the clot, always found in the uterus during the first day of menstruation, was present. Uterine epithelium and glands were present and fragments of cellular stroma showing the usual infiltration with leucocytes. There was no marked "deciduous" appearance of any individual cell.

The endometrium showed necrosis of superficial layers with extravasation of blood usual with menstruation. The thickened endometrium showed differentiation into *stratum compactum* and *stratum spongiosum*, as the menstrual endometrium does, resembling closely the decidua of early pregnancy. Superficial portions of the endometrium were detached by extensive extravasation of blood, the crumbling process involved both stroma and glands.

This careful examination made it quite clear that the uterine phenomena following excision of the *corpus luteum* were identical with those of normal menstruation.

The endometrial growth observed prior to both normal and artificial menstruation produces a true

decidua ready to perform its function if fertilization occurs.

It is interesting to note that the menstrual period due on June 20 was missed, but that a perfectly normal period occurred on July 22, that is four days later than the calculated date.

It would seem then that the excision of the *corpus luteum* merely antedated the normal development and degeneration of the endometrium and so precipitated the menstrual flow. The experiment did not alter the normal rhythm of the function, it merely disturbed it for one month only.

Ovulation in the human being occurs about thirteen days after the commencement of the last menstrual period; the rupture of the follicle is followed by rapid proliferation of the *membrana granulosa* cells to form a *corpus luteum* which reaches maturity so quickly that by the nineteenth day it is fully developed. During the same period the endometrium develops into what is morphologically and physiologically a decidua ready to receive a fertilized ovum. If the oocyte does not meet the male gamete the disappointed *corpus luteum* begins to degenerate.

There seems little doubt that the *corpus luteum* is responsible for the endometrial preparation for pregnancy and this by means of an internal secretion, since it occurs after a successful transplantation of the ovary. If pregnancy does not occur the degeneration of the *corpus luteum* is rapidly followed by necrosis of and extravasation of blood into the endometrium which is cast off. The disintegration of the cellular elements and hæmolytic of the blood clot results in the typical normal menstrual flow. Every menstruation is what has been called an *afertile abortion*, the premenstrual endometrium a menstrual decidua and the menstrual discharge is a menstrual lochia.

If, however, pregnancy occurs, the *corpus luteum* continues to develop, the decidual endometrium fulfils its proper destiny of securing and nourishing the fertilized oocyte. After further development and at about the third or fourth month of pregnancy the *corpus luteum* begins slowly to degenerate and towards the end of pregnancy it has retrogressed considerably.

Again the absence of its internal secretion so affects the uterus and its contents that degenerative changes occur in the decidua, activity of the uterine muscle is initiated and labour occurs. It is common knowledge that during the last weeks of pregnancy uterine contractions increasing in severity are a usual experience of parturient women indicating the lessened control of the *corpus luteum* over ovarian activity.

The point which now arises, is whether the internal secretions of the ovary exert a direct action upon the uterus or its nerves or whether they use other endocrine glands as intermediaries.

Upon this problem the work of Dixon and Marshall throws a flood of light. Working with dogs, they investigated the effect of various ovarian extracts upon the pituitary body. Their method con-



sists of tapping the cerebro-spinal fluid of anaesthetized dogs which are then injected intravenously with the extract to be tested. Samples of cerebro-spinal fluid subsequently obtained are tested for pituitrin by adding it to a bath of Ringer's solution in which is suspended the virgin uterus of a guinea pig. Many controls are used and the action of the uterine muscle under various conditions carefully watched. The results of the experiments suggest that, whereas an ovarian secretion stimulated the pituitary and gave rise to positive results, this action was inhibited during pregnancy and during the intermenstrual period by the presence of the *corpus luteum*. In the words of the experimenters:

There is no evidence that ovarian hormones bring about parturition by acting directly on the muscles of the uterus. The secretion of the pituitary has a definite action on the uterine muscle.

The secretion of the ovary in the absence of fully formed and therefore presumably functional *corpora lutea* has a definite specific stimulating effect in promoting pituitary secretion. The secretion of the ovary in the presence of such *corpora lutea*, on the other hand, has no such effect, its action on the pituitary gland being completely negative.

The *corpus luteum* so dominates the ovarian metabolism during pregnancy as to inhibit the normal ovarian secretion, but with involution of the *corpus luteum* at the close of pregnancy the uterus shows an increasing irritability and eventually, when the normal ovarian endocrine mechanism is sufficiently reestablished, the secretion working through the intermediary of the pituitary, becomes an important factor in bringing about labour.

The action of the ovary upon the pituitary undergoes a similar variation in the absence of pregnancy and during the oestrous cycle according to whether *corpora lutea* are present or absent.

In parentheses it may be pointed out that these interesting facts account for the variable potency of commercial preparations of the ovary, for obviously in the collection of material from which to make extracts it is not enough to discriminate between ovaries that contain *corpora lutea* and those that do not, but it is also essential to know what are the stages of development or involution of these *corpora lutea*.

#### The Menstrual Cycle.

It is now possible to elaborate the life story of the menstrual cycle and present it in a fairly consecutive manner.

The fetal and prepubertal ovary is largely concerned in the production of interstitial cells. These and the atretic follicles from which they grow, are the only cellular elements of importance to be found in the ovaries during the periods. Since the ablation of the ovaries in the very young leads to non-development of the secondary sex characteristics, it is reasonable to argue that the proper growth of these is due to the interstitial cells and their internal secretion.

With the advent of puberty the ovary enters upon a stage of increased and new activities and ovulation occurs for the first time.

It is clear that ovulation precedes menstruation. This is shown by observation of the results of child marriage in India as well as by the results of laboratory and clinical investigations. Among certain Indian peoples it is considered a matter for shame

that menstruation should occur prior to consummation of marriage. In many instances of child marriage impregnation occurs before the menstrual flow has appeared. The ovum released by the first follicle to rupture at puberty being fertilized, menstruation is physiologically absent until pregnancy and lactation are over.

It has already been shown that the first *corpus luteum* is the result of the rupture of a follicle and that the primary menstrual period is due to the involution of this body. After the first rupture of a follicle the primary *corpus luteum* rapidly develops to maturity. This is accompanied by endometrial growth and preparation for the liberated ovum.

If the ovum is not fertilized, this endometrial effort is useless, the function of the *corpus luteum* ceases, the lutein cells become atrophic, their secretion no longer inhibits the ovarian stimulation of the pituitary, the premenstrual decidua is cast off and expelled by the pituitrin-excited uterine muscle. The organs concerned then seem to take breath and enter into a stage of quiet growth lasting about eight days. During this period of rest the endometrium is repaired and another follicle quietly matures until about thirteen days after the commencement of menstruation it ruptures and initiates another cycle.

It is usual to enumerate the monthly sequence of events as from the first day of menstruation. Some authorities have adopted the more accurate method of counting the day of ovulation as the first day. This is, of course, more scientific, since the first menstrual cycle is started by the first ovulation and not by the first menstruation.

If now the ovum liberated by rupture of a Graafian follicle, becomes impregnated, the *corpus luteum* becomes a much more important structure. It, in the first place, causes the usual endometrial preparation which fixes the zygote and it also continues to grow in size and energy, contributing greatly to the development of a safe and normal pregnancy. When the span of intrauterine life is almost complete, the secretion of the *corpus luteum* begins to fail, inhibition of the ovarian action upon the pituitary is withdrawn and uterine activity leading to labour is stimulated.

It is interesting to note that the period of gestation, two hundred and eighty days, is a multiple of the menstrual cycle, that artificially induced menstruation does not alter the four weekly rhythm and that menstruation following pregnancy reappears after an interval which, measured from the last menstrual period, is also a multiple of twenty-eight days.

It is obvious that there are many gaps in this story and many activities that are unexplained. We do not know why the menstrual cycle in human beings is of twenty-eight days or what maintains this rhythm throughout sexual life. It is not clear what initiates the first rupture of a follicle, what changes occur at puberty to establish regular ovulation. Neither do we understand fully the significance of the increase of interstitial cells during pregnancy. Nor do we know what occasions the

involution of the *corpus luteum* in the absence of fertilization.

There is no doubt that certain of the endocrine glands act as accessories to the ovary, notably the pituitary gland. The work of Dixon and Marshall, already described, shows that the ovary produces at least two internal secretions, that of the interstitial cells which powerfully stimulates the pituitary and that of the *corpus luteum* which inhibits this action. Schafer states that the anterior lobe of the pituitary governs the growth of the skeleton and body generally, whilst the autocoid produced by the posterior lobe affects carbohydrate metabolism, fat formation, the development of the sex glands, stimulates involuntary muscle and the secretions of the kidneys and mammary glands.

Removal of the ovaries during infancy causes the well-known arrest of development, adiposity and infantilism which bear a striking resemblance to the syndrome associated with the name of Fröhlich and which is due to hypopituitarism and sometimes called *dystrophia adiposogenitalis*. Spaying of the young female leads to considerable shrinkage of the hypophysis. On the other hand during periods of ovarian activity, such as menstruation and pregnancy, there is a very considerable hypertrophy of the pituitary. Pituitary disease or damage associated with healthy ovaries causes arrest of development, because the deficient gland cannot respond to the hormone of the interstitial cells. Similar arrest occurs with a healthy pituitary, if the interstitial hormone is removed by ovariectomy.

It is reasonable to argue that the activity of the pituitary depends upon the stimulus it receives from the secretion of the ovarian interstitial cells. This view is strengthened by the findings of Steinach and Scheidt that the changes in the pituitary that result from spaying, can be prevented by ovarian grafting and since the generative cells of the graft atrophy, they ascribe the result to the interstitial cells.

Before attempting to trace the influence of the pituitary secretion, encouraged by the interstitial hormone, upon the various phases of feminine development and activity, I want to include the phenomena of mammary growth and for that purpose may I direct your attention to them.

#### The Phases of Growth of the Mammary Glands.

The growth and development of the mammary glands are closely associated with the functions of menstruation and pregnancy. In the life history of the female this growth does not follow a continuous unbroken curve, but occurs in a series of waves. Intrauterine growth of the fetal mammae is continuous and regular until the last month of pregnancy when the first wave of increased development occurs. In the prepubertal period there is regular growth in conformity with the general growth of the body. At puberty the second and well marked wave of increased growth occurs. In many women there are a series of waves of increased growth occurring at each menstrual period, these are known collectively as the third growth impulse. With the onset of pregnancy the fourth wave occurs, the

changes this time being the final step in the preparation of the glands for milk secretion.

Experiments have been conducted by many observers to discover the effects, if any, of endocrine extracts upon the mammary glands. The results have been various, conflicting and confusing, but two results seem convincing. The careful investigation of Lane Clayton and Starling leave no doubt that the *corpus luteum* is not an important factor in the growth of the mammary gland at pregnancy. Schafer and MacKenzie have demonstrated that pituitary extracts act as galactagogues. These facts suggest that the ovarian stimulation of the pituitary in the absence of active *corpus luteum* may play a part in the successive waves of mammary development.

#### The Stages of Growth of Interstitial Cells of the Ovary. During Prenatal Growth.

Prior to birth interstitial cells are found in the ovary and under their influence the pituitary is already exerting its influence upon the development of sex characteristics. The feminine type of pelvis has been recognized at the twentieth week and other skeletal feminine features can be detected. During this time there are no *corpora lutea* and the interstitial cells receive no check in their secretory output.

Before birth the growth of the fetal mammae is continuous and regular until just before parturition when there is a wave of increased development which coincides with the appearance of many interstitial cells in the fetal ovaries and therefore presumably with an increased supply of pituitrin.

#### During Prepubertal Life.

During prepubertal life there is again an absence of *corpora lutea* and a generous growth of interstitial cells ensuring an active pituitary gland under the influence of which there is a regular growth of the genitalia and the mammary glands in conformity with the rest of the body.

#### At Puberty.

It has been observed that prior to the changes of puberty there is a definite increase of interstitial cells in the ovaries. The resulting improvement in pituitary output is manifested by the rapid sex development, mammary enlargement, deposition of fat, appearance of pubic and axillary hair. When these changes are nearly complete, ovulation occurs. The reason for the rupture of a follicle at puberty is not known, but I suggest that again we must look to the pituitary hormone for the reason.

As the pubertal changes approach completion there is still considerable interstitial hormone stimulation going on and abundance of pituitrin circulating. The ovarian stroma is very rich in involuntary muscle fibres which are being powerfully stimulated. The increased contraction of these would tend to thrust the growing follicle through the ovarian cortex until the *tunica albuginea* of the ovary yields and rupture occurs.

#### During Menstrual Life.

Menstrual life has already been fully dealt with and it has been shown how the development of the

*corpus luteum* inhibits the pituitary stimulation and allows the uterus to prepare for pregnancy. If this does not occur, the *corpus luteum* involutes, the inhibition is withdrawn, the pituitary output is resumed and the uterus excited to expel its crumbling endometrium as a menstrual lochia. The decline of the *corpus luteum* and the return of the pituitary hormone to the circulation precede the appearance of the menstrual discharge and apparently coincide with the period of mammary activity which so commonly heralds the onset of menstruation.

#### During Pregnancy.

During pregnancy there is a very definite increase in the number of interstitial cells and in the pituitary secretion. During the early months and until the ovum is securely fixed, this activity is in part inhibited by the well developed *corpus luteum* of pregnancy. Some stimulation of the pituitary, however, probably takes place, the output being utilized in the early mammary hypertrophy. During the latter part of pregnancy the control of the *corpus luteum* is declining and the pituitrin increase is absorbed in part for mammary development and in part for uterine stimulation leading up to parturition. An explanation for so-called spontaneous abortion may be found in some derangement of these activities.

#### Post Partum.

After labour and its great demand for pituitrin are over, the rapid decline of the *corpus luteum* leads to an excess of this substance in the circulation. It is fully utilized for *post partum* contractions, involution and the maintenance of milk supply. When these demands are satisfied, the ovarian involuntary muscle is again actively stimulated, a follicle ruptures and menstruation returns. If mammary activity is suppressed prematurely by weaning, pituitrin is released from mammary use and able again by ovarian stimulation to initiate the rupture of a follicle and the return of menstruation.

The relatively common coincidence of lactation and menstruation suggests the existence of many active interstitial cells which lead to a greater output of pituitrin than is needed to maintain mammary secretion, the excess exciting follicle rupture. Women who menstruate during lactation, frequently complain that their milk supply declines prior to the onset of the periods, that is, when the luteal inhibition of ovarian stimulation of the pituitary is in the ascendant.

Still no explanation has been offered for the twenty-eight day cycle of human menstruation or any reason suggested for the involution of the *corpus luteum* in the absence of pregnancy.

#### The Twenty-Eight Day Cycle.

We are quite in the dark as to the meaning of the twenty-eight day cycle; it is presumably a specific attainment of the human race. Functional evolution progressing, *pari passu*, with morphological evolution, influenced by environment, habits, the

erect posture and many other external forces, has achieved a twenty-eight day cycle as most suited for the human species. Beyond this "*confessio ignorantiae*" it seems impossible to go.

#### The Decline of the Corpus Luteum.

The involution of the *corpus luteum* is sudden in onset and rapid in progress; it is associated with diminution of the inhibition which the luteal hormone imposes upon the interstitial cells. What initiates it is unknown, but one interesting suggestion has been made by Whitehouse.

When the ovum escapes from the ruptured follicle it is surrounded by membrana cells which form the *corona radiata*. These cells are identical with those remaining in the follicle to proliferate and form the luteal cells. In the absence of pregnancy the ovum and *corona radiata* perish. Whitehouse suggests that the death and absorption of the *corona radiata* cells act in a way similar to a vaccine which, catching the *corpus luteum* in what corresponds to a negative phase, causes its breakdown and rapid involution.

#### The Medico-Legal Aspect of Artificial Menstruation.

The reaction of the uterus to destruction of the *corpus luteum* has an interesting medico-legal aspect.

Disturbance of menstrual function following traumata has been made a basis for a claim for damages. The explanation of such untimely menstrual flow is often the damage done to a maturing follicle or *corpus luteum*. If her *corpus luteum* is approaching maturity when a woman meets with an accident, it is possible for it to be ruptured by the violence sustained; in such a case menstruation would begin within thirty-six hours. If a maturing follicle were similarly ruptured prematurely, menstruation would set in eight to ten days later, that is after the resulting *corpus luteum* had matured and degenerated. For example, if a woman met with an accident on the seventh day of the menstrual cycle and a follicle were thereby ruptured, instead of maturing naturally on the thirteenth day, the next period would appear six days before the expected date. If a woman, pregnant to a period not exceeding the third or fourth month, meets with an accident so that the *corpus luteum* of pregnancy is ruptured, it is certain that she will abort.

Whilst such an abortion would constitute good grounds for an action for damages, it is doubtful that a temporary and harmless alteration of the rhythm of menstruation would *per se* be sufficient to justify such an action.

#### Pathological Menstrual Bleeding.

I am afraid that I must plead guilty to a good deal of speculation in this presentation of my ideas upon the vital processes underlying the function of menstruation. This speculation is, however, not entirely without foundation. The recent experimental work has advanced our knowledge and added considerably to the data from which to construct



theories. Especially does this apply to the work done by Dixon and Marshall upon the correlation between the ovary and the pituitary. In order to justify the comprehensive title of this paper, may I add a few brief remarks upon pathological menstrual bleeding.

The old nomenclature of pathological menstrual hæmorrhage has been during recent years elaborated by the addition of many new words purporting to define more clearly the nature and incidence of the bleeding.

The old terms menorrhagia and metrorrhagia have been retained, but in addition use has been made of menostaxis, metrostaxis, epimenorrhœa, epimenorrhagia, epimenostaxis and so on. Theoretically these definitions of menstrual derangement are excellent, but in practice this multiplicity of words is unwise. The coining of a new word for a condition which may be not only ill-defined, but also incapable by reason of complexity of a strictly accurate title, is to be deplored.

The classics are frequently abused and the additions to the medical vocabulary are often hybrid in type and an offence to the ear. Moreover, the too easy invention of names is often detrimental to scientific progress, since a label in dog Latin or Greek is often an "*asylum ignorantie*" that inhibits further research. This is the classification that I use in my work.

#### *Epimenorrhœa.*

The word epimenorrhœa, coined by Blair Bell, means too frequent periods of normal duration and loss. It is usually due to overactivity of the ovaries. The normal rhythm is disturbed and ovulation is occurring at shorter intervals than twenty-eight days. The result of this over-activity is shown both in the ovaries and the endometrium. The ovaries are frequently polycystic and contain an excess of retrogressive lutein tissue, resulting from the too frequent formation of *corpora lutea*. When the condition has lasted some time, the endometrium becomes hyperplastic from frequent excitation by the excessive lutein tissue of the ovaries. Treatment by curettage is useless, such an operation scrapes away the remains of the last menstrual decidua, but does not affect the cause of the condition. Epimenorrhœa is probably due to some disturbance of the correlation of the accessory sex glands and the ovary. When occurring in early menstrual life, it is often associated with enlargement of the thyroid. Recently good results have been obtained by inhibiting thyroid action by irradiation of that gland.

#### *Menorrhagia.*

Menorrhagia is of two kinds, a prolonged period and a period of normal duration but excessive loss.

Prolonged menstruation is due to incomplete expulsion of the necrosed endometrium. Whitehouse aptly calls it "an incomplete abortifacient abortion." In all probability it is due to irregular function of the *corpus luteum* which retrogresses with undue slowness, thus hindering pituitary action, endometrial

breakdown and uterine muscular activity. Even so this condition is often cured by curettage.

The form of menorrhagia known as excessive is usually due to uterine insufficiency resulting from subinvolution, metritis or both. Since subinvolution is so frequently due to chronic metritis, initiated by infection occurring at parturition or miscarriage, it is simpler to consider them together. The subinvolved uterus is found on examination to have an excess of fibrous tissue amongst its musculature, the contractile efficiency of which is thus impaired. The blood vessels are often surrounded by a sheath of fibrous and elastic tissue which offers a serious barrier to their proper muscular control. There are endometrial changes also, but to detect these it is necessary to obtain specimens of it during the hæmorrhage, for regeneration of the endometrium takes place rapidly and intermenstrual curettage will show nothing abnormal. Scrapings taken during the period, show unusually massive necrosis of the *decidua spongiosa* with extensive subepithelial pools of extravasated blood. The whole condition is comparable to *post partum* hæmorrhage and is due to the inability of the damaged uterine muscle, impeded by fibrous tissue deposits, to control the uterine blood vessels.

Regarding treatment, curettage temporarily relieves, irradiation of the thyroid has been successful and intrauterine radium applications have proved very satisfactory.

#### *Metrorrhagia.*

The term metrorrhagia, applied to uterine bleeding not associated with menstruation, includes hæmorrhage due to many and varied causes which are outside the scope of this paper. There is, however, one form of intermenstrual loss, that is often termed metrorrhagia, which is in reality an untimely menstrual period. Such bleedings are due to shock or emotion and seem to depend upon the little understood or investigated innervation of the uterus and accessory sex glands.

It is well known that profound emotion, especially fright, causes increased activity of the thyroid and pituitary and it is probable that by interrelationship with the ovary such activity may explain the disturbance of menstruation that may follow, say, a severe emotional shock.

Whitehouse has remarked that "a woman may possibly blush with her uterus as well as her skin."

#### THE CAUSES AND TREATMENT OF EXCESSIVE UTERINE HÆMORRHAGE AT OR ABOUT THE MENOPAUSE.<sup>1</sup>

By RUPERT MAGAREY, M.B., B.S. (Adelaide),  
Honorary Gynaecologist, Adelaide Hospital,  
Adelaide.

EXCESSIVE uterine hæmorrhage at or about the menopause which is the part of the subject allotted to me is obviously much too large to be dealt with

<sup>1</sup> Read at a meeting of the South Australian Branch of the British Medical Association on August 25, 1927.



ILLUSTRATIONS TO THE ARTICLE BY DR. R. GRAHAM BROWN.

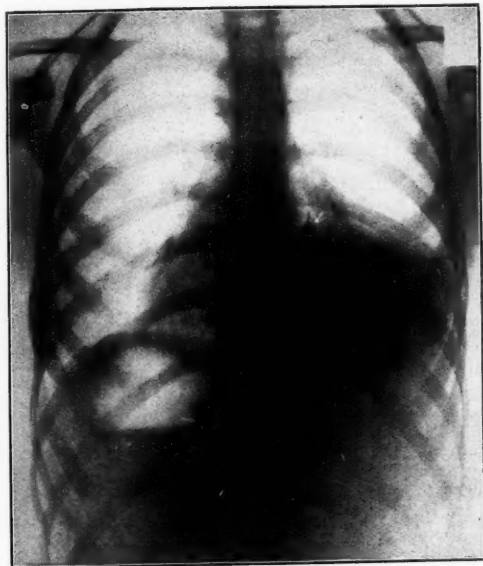


FIGURE I.



FIGURE II.

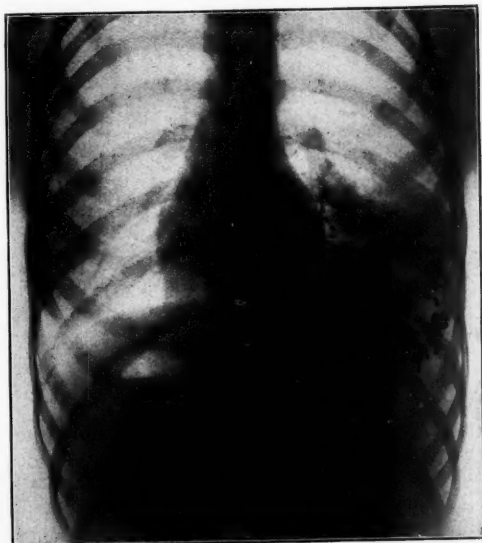


FIGURE III.



FIGURE IV.



ILLUSTRATIONS TO THE ARTICLE BY DR. R. GRAHAM BROWN.

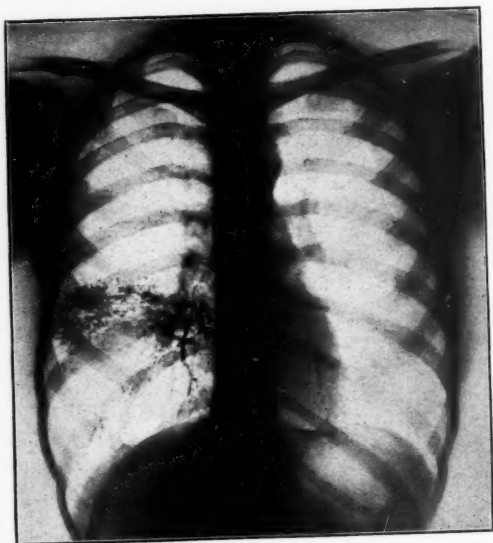


FIGURE V.

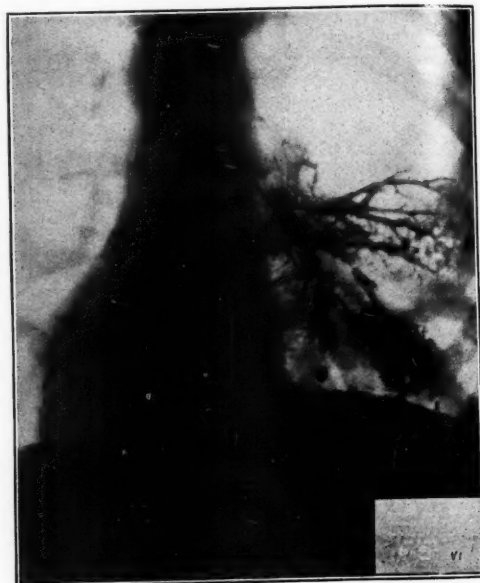


FIGURE VI.

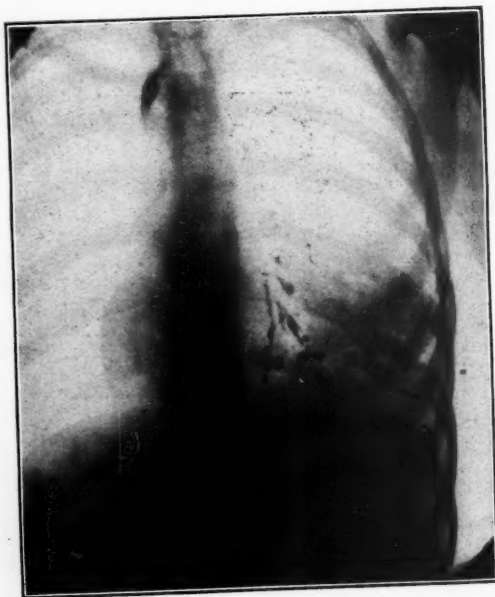


FIGURE VII.

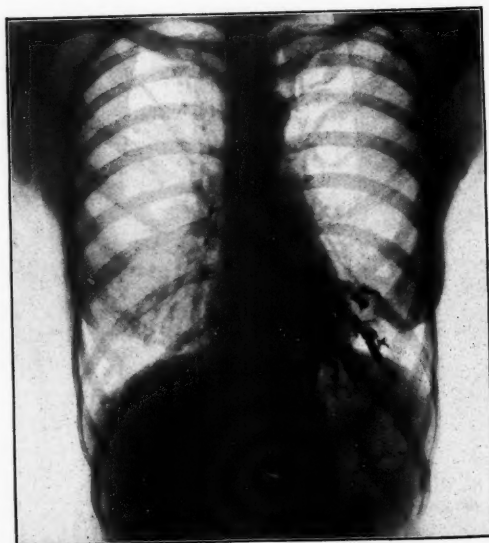


FIGURE VIII.

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at all thoroughly, so I shall merely emphasize the few points which have impressed me most in practice.

A definition which expresses our exact meaning is the first difficulty and our old division of excessive uterine losses into menorrhagia and metrorrhagia does not cover the ground properly. Beckwith Whitehouse in a striking paper published last year has adopted four headings: (i) epimenorrhœa or too frequent menstruation, (ii) menostaxis or too prolonged menstruation, (iii) true menorrhagia or too great a loss at a period normal in time and duration, (iv) metrostaxis or irregular uterine bleeding. This nomenclature is so sound that it must surely be destined to be universally adopted. He also draws a sharp line of demarcation between the first three and metrostaxis, because in the last condition the loss is almost pure blood and is unmixed with endometrial detritus; the endometrium seems to play no part in this condition.

#### Causation.

Next with reference to causes. Of the extragenital causes I shall briefly refer to two only, although they are legion. The first is connected with the thyroid. I was surprised to hear Sir Joseph Verco in a paper which he read on the thyroid gland about two years ago, refer to thyroid insufficiency as a cause of menorrhagia. I had always considered it a frequent cause of amenorrhœa, of course, but not of the opposite condition. On looking the point up, I found that Novak makes the definite statement that the effect of thyroid insufficiency is more often menorrhagia than amenorrhœa. Jellett, on the other hand, doubts this and although I have been on the lookout since Sir Joseph's paper, I have seen only one case in which I could suspect thyroid insufficiency.

On the other hand, of course, we all recognize that thyroid excess produces menorrhagia and it appears to be definitely benefited by radiation of the thyroid. Another method of treatment for thyroid excess is the administration of calcium in some form. Now I frequently find that an otherwise unexplainable menorrhagia occurs at the end of lactation for which treatment by calcium salts is most useful. The explanation may be that the woman's thyroid is continuing its excessive secretion which was physiological during the pregnancy, but has remained to become pathological.

The second extragenital cause which I shall just mention in passing comes under the heading of general diseases and is influenza. I think it is probably often overlooked. After the 1919 epidemic it was fairly common for the female patients to complain of menorrhagia which, however, appeared to disappear after a few months, apparently after return to normal health.

The first of the uterine causes upon which I would comment, is some retained products of conception. This may seem too obvious for comment, but I have for some time been impressed by the number of women sent to the gynaecological department to have various operations performed in order to cure their menorrhagia who have been cured by the complete emptying of their uteri, some small relic of

decidua being removed. Quite often they give a history of having had a curetting of the uterus done for a miscarriage some months previously. For some time I have been trying to impress on my students the fact that an immediate curetting is not the best treatment for an inevitable abortion, but that tight packing of the vagina for twenty-four to thirty-six hours will effectually check all hæmorrhage, will produce dilatation of an undilated cervix and will stimulate the uterus to contract. On removal of the packing the uterus can be more thoroughly emptied, usually without further dilatation of the cervix, without the use of a sharp instrument and unattended by the excessive hæmorrhage which so frequently occurs when the attempt is made immediately, and which interferes with the thorough emptying of the uterus because of the hurry caused by its presence. I speak dogmatically on this point, for I worked for twelve years in an industrial district where abortions were as common as flowers in the spring. I always packed and never regretted doing it, but the packing must be tight.

Recently I had to curette the uterus of a young married woman whom five months previously I had attended with her first confinement. The confinement was perfectly normal, there being no question at the time of incomplete placenta or membranes, yet on curetting the uterus I found a small patch hardly bigger than a pin's head with a prominent vessel on its apex like a bleeding point in a nasal septum. This was probably decidual, though I did not have it examined.

Of the malignant causes of hæmorrhage, the one on which I would lay stress, is the endocervical carcinoma. A very good rather advanced specimen of this has been shown by me tonight and I stress it because of its insidiousness. It is quite possible for a medical man to be suspicious of malignancy, even to expect to find it and yet to miss this particular form, because the vaginal surface of the cervix looks and feels smooth and normal. It may be found so on two or three separate examinations and then suddenly the examiner is shocked to find that the examining finger enters a sloughing crater where the cervix used to be. The cancer has extended from the cervical canal to the periphery and the intravaginal part of the cervix has suddenly sloughed away. In the early stages even a diagnostic curettage may fail to reveal the true condition, for it is usually the uterine body and not the cervix which is curetted. But it may be noticed that the cervix itself from external to internal os is fusiform or barrel shaped and this should, I think, lead to the diagnosis.

The non-malignant causes which are most commonly overlooked, are, I think: (i) small sessile cervical polypi, (ii) intrauterine polypus, (iii) an enlarged thickened, possibly lacerated cervix, (iv) previous operations on tubes or ovaries. The cervical polypus needs little comment beyond saying that inspection rather than palpation of the cervix will reveal it. The intrauterine polypus is frequently associated with multiple small fibroids in the uterine wall and can apparently be easily missed even at a curetting. In my experience this polypus appar-

ently at times causes a temporary amenorrhœa followed by a profuse loss, a metrostaxis rather than a menorrhagia.

The enlarged thickened cervix must be emptied rather than repaired to cure the hæmorrhage.

This brings us to the fourth cause I have noted, namely, previous operations on tubes or ovaries. This seems to be a common cause of excessive loss and I think it is because the cause of the condition for which the previous operations have been done, is probably infection, either gonorrhœal or septic, and this same infection has produced a condition of chronic metritis in the uterine wall. In other words, there has been a replacement of a great part of the actual muscle fibre of the uterine wall by fibrous tissue thus producing the so-called *fibrosis uteri*. This condition must be differentiated from subinvolution. In the latter condition the pathological change is in the blood vessels themselves. Briefly put, the walls of the original blood vessels inside which the new blood vessels grow during involution, are not completely absorbed and that portion of them which remains, acts as an elastic buffer, preventing the vessels from being properly contracted. Fletcher Shaw, who has elaborated this difference at some length, points out that chronic metritis can and does occur in a nulliparous woman. We frequently meet patients with this type of condition in hospital practice and short of hysterectomy they are difficult to deal with and I believe that if hysterectomy is performed, it should be a complete, not a subtotal removal of the uterus, for the remaining cervical stump is infected and will cause an annoying leucorrhœa to remain.

#### Treatment.

With regard to treatment I am instructed to confine my remarks to treatment by radium. Three years ago I read a short paper on radium treatment. My subsequent experience has served only to confirm my opinion of its value. In these cases at or about the menopause it is particularly useful. In fact I think radium may be regarded as a specific for the treatment of excessive uterine bleeding at this period of life, certainly in cases which are due to subinvolution. In a series of approximately eighty cases it has been necessary to perform subsequent hysterectomy in two only. Both the patients were suffering from chronic metritis rather than subinvolution. They had both had previous operations on their adnexæ. The same claim may be justifiably made for radium in those cases of fibroids which cause hæmorrhage and in which the uterus is enlarged to about the size of a three months' pregnancy. In my experience a fairly heavy dose of radium, approximately 600 milligramme hours, invariably stops the hæmorrhage completely. This treatment is particularly useful for women who will stand operation badly, for the radium can in women of this age be inserted into the uterus without anaesthesia. If the patient is examined twelve months later, the fibroids are usually found considerably shrunken.

There are three points about which I have learned to warn patients before treating them with radium:

(i) That the full effect of radium is frequently delayed for several months; (ii) that in the interim their menstruation is likely to be quite irregular in time and quantity and (iv) that for the first six weeks or so they may have a rather profuse leucorrhœa.

If I may digress from the menopausal state and refer to radium treatment in young women, it is necessary to be very cautious as to dosage lest oligomenorrhœa or possibly sterility be produced. About 20% of my patients have been women under twenty-five. Unfortunately only one or two have been subsequently married. In one case I think I gave an overdose, 240 milligramme hours, and she reports that she menstruates regularly, but that the period lasts two days only. She is in splendid general health (her own words). Her treatment was five years ago.

Another patient, a woman of twenty-eight, was married for four years without a pregnancy. She had excessive and prolonged menstruation without obvious cause. At the end of this time I treated her with radium. Fifteen months later she became pregnant and five months later she miscarried a perfectly developed fœtus. Critics of radium treatment would maintain that she had a miscarriage because of her radium treatment. I think that she would never have become pregnant without it and I am awaiting her future achievements in this direction with great interest.

#### THE USE OF "LIPIODOL" BY INJECTION INTO THE BRONCHI AND BRONCHIECTASIS IN CHILDREN.<sup>1</sup>

By R. GRAHAM BROWN.  
Brisbane.

##### The Use of "Lipiodol" by Injection into the Bronchi.

It is now generally recognized that an ordinary X ray picture of the chest does not give sufficiently accurate information in cases of bronchiectasis, but that after the injection of "Lipiodol" so much more definite details and information can be obtained, that it is advisable to use the latter method whenever practicable. Details of the technique of injecting "Lipiodol" into the bronchi would not, therefore, be out of place.

"Lipiodol" is a pale yellow, heavy oil which contains 40% of iodine mainly in chemical combination in oil of poppy. A drop of the oil in water sinks to the bottom, but if it is allowed to spread on the surface it will float. The technique of the use of "Lipiodol" in the lung depends upon these factors, that is, gravity and spreading quality.

Seeing that "Lipiodol" is heavy, it is safe to inject fairly large quantities, because it will always tend to flow to the posterior lobe, be the patient in an upright or in a recumbent supine position. If "Lipiodol" remains in the bronchi, coughing may scatter it over the whole lung and once the oil has lined the alveoli, it is hard to displace it. "Lipiodol"

<sup>1</sup>This paper is based upon remarks made at a meeting of the Queensland Branch of the British Medical Association on May 6, 1927, during a demonstration, made conjointly with Dr. Val. McDowall, of a series of lantern slides illustrating bronchiectasis and the use of "Lipiodol."



is seen to move with the heart beat when it is in the near neighbourhood of the heart and so, when photographs are being taken, a flash exposure must be made. If the "Lipiodol" is far from the heart, no movement is seen with the heart beat. The elimination of the "Lipiodol" takes place mostly by coughing which clears the bronchi and bronchioles, but the alveoli retain the "Lipiodol" for some days and some observers report its presence in the alveoli as long as two months after injection. That there is an absorption of the drug is shown by the fact that iodine can be recovered from the urine after the injection of the drug into the bronchi.

Bronchiectasis is not diagnosed easily either clinically or by X rays, especially when the cavity is overlapped by the heart. "Lipiodol," however, gives a characteristic idea of the disease. The dilated bronchioles become filled up in their proximal parts, while the terminal parts may not be filled, probably because they are already filled with pus. The picture then is a club-shaped end or it may be convex or pointed according to the shape of the space into which it has flowed, or to the presence of pus already in a small cavity. A picture of bronchiectasis immediately after injection may appear like a bunch of grapes or like the fingers of a glove (see Figures III, VII and VIII). Other cases give the appearance of cylinders (see Figure VIII) or branching short rods with club-shaped ends (see Figure VI). A few days after injection and as the "Lipiodol" is disappearing, the proximal parts of the rods disappear and drops of "Lipiodol" remain in the dilated bronchioles for varying periods.

"Lipiodol" will not enter an abscess except under certain circumstances:

1. If the abscess is towards the front of the chest, it will not of course fill up with the patient lying on his back when the drug is injected.
2. If the abscess does not communicate with a bronchus or bronchiole.
3. If the abscess is already filled with pus, unless its opening into the bronchus is large.
4. Although "Lipiodol" is heavier than pus, it will not flow through an opening less than three millimetres (see Figure VI inferiorly and close to the pericardium).

The differential diagnosis of lung abscesses and new growth from other conditions in the lung is indicated by negative rather than positive results. In other words, "Lipiodol" avoids an enclosed abscess or tumour and enters the surrounding lung, leaving an area of lung free from "Lipiodol" and outlined by the "Lipiodol" in the neighbouring alveoli.

Tuberculous cavities, since these are empty and freely communicating with the bronchi, are easily injected with "Lipiodol," but generally speaking it is unnecessary to use the drug in this condition and some authorities are definite in their opinion that "Lipiodol" should not be used in tuberculosis of the lung.

Pirie gives the following indications for the use of "Lipiodol" in the lung:<sup>(1)</sup>

1. Suspected bronchiectasis.
2. Suspected tuberculosis when tubercle bacilli cannot be found in the sputum.
3. After thoracoplasty when the patient is not doing well.
4. For demarcation of the diaphragm when the diaphragm is invisible in suspected subdiaphragmatic abscess.
5. Exclusion of bronchiectasis before performing thoracoplasty.
6. Localizing a known abscess.
7. Stenosis of the trachea and bronchi.
8. Demonstration of tuberculous cavity.
9. Broncho-pleural fistula.
10. Foreign bodies.
11. Negative diagnosis of bronchiectasis.

The following are the methods of injecting "Lipiodol" into the lung:

1. Puncture through the crico-thyroid membrane.
2. Puncture through the trachea below the isthmus of thyroid.
3. The transglottic route: (a) With a laryngeal syringe, with or without a tracheal rubber tube extension; (b) with a nasal tube which is directed into the trachea between the vocal cords; (c) *via* the bronchoscope.

I have used all the above methods and am of the opinion that the transglottic route, using the laryngeal syringe and following the technique of the Hajek clinic, of Vienna, is the method which in my hands has given the best results. Cases have been reported of mediastinitis followed by fatal terminations as a result of infection following puncture of skin, that is, with the needle in tracheal injections.<sup>(2)</sup> However, certain authorities advise this route as the best.<sup>(3)</sup> The bronchoscopic method is perhaps the most scientific provided the procedure is performed under local analgesia. However, in the average case it is a method which is found unnecessary. In some cases it is useful to pass a nasal tube and direct the tip through the glottis into the trachea. By this means the operator is able to inject the "Lipiodol" with the patient in any required posture. The method has decided advantages in some cases.

"Lipiodol," being a viscid oil, must be heated to about body temperature. This can be done by immersing the container and the syringe and attachments in hot water. The viscosity is thereby reduced and the lowered viscosity allows of easier expression from the syringe and easier flowing. A ten to twenty cubic centimetre glass syringe is needed and when injection is made by means of a needle, a large calibre one about gauge fifteen is required. The ordinary attachment to the laryngeal syringe is suitable for the transglottic route. It is advisable in some cases to give adult patients morphine beforehand and children some compound tincture of camphor. In following the transglottic route it is necessary to anaesthetize the larynx thoroughly and this is done by swabbing with a

10% solution of cocaine and a 1 in 5,000 solution of adrenalin.

The trachea also must be anaesthetized and this can be done by injecting with the laryngeal syringe a few cubic centimetres of a low percentage solution of cocaine. The majority of patients can be injected without the use of morphine, but, speaking generally, great patience is needed on the part of both the operator and the patient, especially in the case of children. After the larynx is anaesthetized it generally takes from five to ten minutes to inject ten cubic centimetres of "Lipiodol." For injecting by means of a needle directly into the trachea the patient should be lying down with the head slightly raised, whereas for injecting *viâ* the glottis the patient should be in a sitting-up position.

"Lipiodol" gravitates into the most dependent part and generally to the right, but frequently to the left base. My experience is that it flows almost equally as often into the left bronchus as into the right, but that it confines itself generally to one side or the other; that is with the patient sitting in an exact vertical position. In a sitting-up position there is a little difficulty in getting the "Lipiodol" to flow into a particular bronchus. To be certain, the patient must be made to lean over to the right or to the left side, according to the portion of lung which it is desired to fill. This makes the procedure a more difficult one. It is, therefore, on the whole easier to inject with a syringe and needle directly into the trachea, but this method has its dangers as already pointed out. Since the vomiting associated with general anaesthesia nullified efforts made, injection *viâ* the bronchoscope is satisfactory only under local analgesia, unless the operation be performed in the X ray room and the photograph taken immediately the injection is completed and while the patient is deeply anaesthetized. It appears that "Lipiodol" causes no discomfort if used in moderate amounts and there are no ill effects. It is stated by some authors that iodine has been recovered from the urine. In passing, I would like to mention that one of my patients, a young woman with advanced bronchiectasis who also had the symptoms of asthma well marked, had a "fainting turn" on a railway platform some one and a half hours after leaving the surgery. This may have been due to cocaine or on the other hand may have been psychical. "Lipiodol" is still used by some surgeons as a therapeutic agent in cases of bronchiectasis, but it is questionable whether this drug has any local beneficial action.

To sum up, it may be said that by injecting "Lipiodol" in bronchiectasis we get a positive evidence of dilatation of the bronchi and of abscess formation *et cetera* and that the picture is characteristic. It is the only positive method of proving the diagnosis without resorting to bronchoscopy. The ordinary X ray picture gives little more than an indication of bronchiectasis, while a picture taken after injection of "Lipiodol" may be pathognomonic. For these reasons then I may be excused for suggesting that this procedure should be fol-

lowed in all cases of chronic infection of the lung, tuberculous lesions, of course, being excluded.

#### Bronchiectasis in Children.

I would like to point out how frequent is the association of antral disease with bronchiectasis in children. We must remember that in Brisbane, at any rate, there is quite a large number of patients with this type of case, and I would like to draw the attention of the members to remarks made by me in 1921 in a paper entitled "Recent Advances in Ear, Nose and Throat Specialty," published in THE MEDICAL JOURNAL OF AUSTRALIA of May 28, 1921, where I pointed out that there was a typical facial appearance in connexion with these cases of bronchiectasis associated with antral disease in children and that one was frequently able to make a "spot" diagnosis. At the time I showed several patients to illustrate these points. These patients appear to be in a healthy state, whereas they are far from well and I would like to apply the term of "pseudo-robust" to them. With a casual look at such a child as it comes into the consulting rooms, one would remark: "What a fine specimen of a child." However, the history is so frequently given that the child's health is "up and down" (mostly down). The mere mention of a "loose" cough, however slight, should suggest to the practitioner the possible presence of bronchiectasis and it should therefore be excluded. My practice upon hearing such a cough is to make the child cough strongly and bring up, if possible, the secretion. An excellent procedure is to hold the child by its legs with its head down during the forced coughing. The

presence of a "rattle" on coughing is strongly suggestive of the presence of bronchiectasis. Over and over again the parents of such a child state that they had never previously seen any foul sputum from the child, the probable reason being that the child coughs just sufficiently hard to bring the secretion out of the larynx and then immediately swallows it. Figures IX and X show this "pseudo-robust" appearance of these children. I would like to point out that the broadness of the face is in some cases even exaggerated and I at present hold the view that the presence of pus in the antra in young children tends to expand the upper jaws to a greater degree than

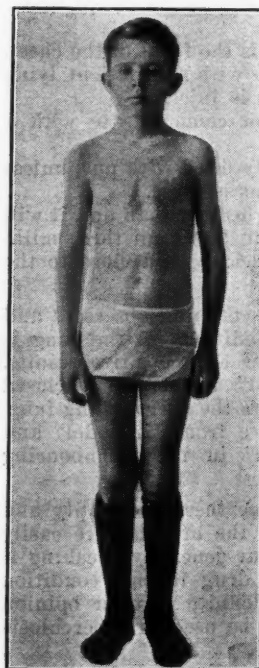


FIGURE IX.

does air in its normal passage through the nostrils and sinuses *et cetera*. I would suggest that a comparison of this "broad" face be made with that of the normal face and more particularly with the "hatchet" face of an adenoid child (see Figure XI) in which case there has not been sufficient passage of air through the nostrils and sinuses. In contrast, I would like to draw attention to the photograph of a girl who had a large bronchiectatic cavity at the right base, secondary to a foreign body in the right bronchus which had been there for over ten years. She had no antral disease, but she had the typical adenoid facies (see Figure XI).

I classify bronchiectasis in children into two groups: (i) Those associated with and probably dependent upon antral, or more rarely other accessory sinus suppuration, (ii) those not so associated.

This second group, however, I divide into: (a) those associated with a foreign body (opaque or non-opaque to X rays) in the bronchi, (b) those due to other causes, such as following pneumonia, influenza *et cetera*.

In dealing with the first group I maintain that a lot can be done for these children by cleaning up the antral and or other accessory sinus suppuration. I hold that conservative measures should be used as far as the antra are concerned. However, should anything in the nature of adenoids or a nasal obstruction be present, particularly in the middle turbinate region, it should be rectified in a radical manner. Repeated antral washings out after removal of the middle turbinate obstruction *et cetera* give very good results. Even in very young children it is possible to wash out the antra under local analgesia. However, in young children my first investigation of these cavities is always made under a general anaesthetic. The method of approach to the antra which I employ in these cases, is through the anterior wall of the antrum after injecting about one cubic centimetre of 1% "Novocain" solution at the point of exit of the infraorbital nerve, the injection and subsequent puncture being made under the lip. To puncture an antral cavity in a young child *via* the nose is in a majority of cases an unsatisfactory proceeding and I consider in some cases almost impossible to perform without decided

risks even with the aid of a general anaesthetic. At subsequent "washings out" it is an easy matter to find the original perforation in the anterior wall of the antrum.

The second group, that is those cases due to foreign bodies, hold out a favourable prognosis upon removal of the foreign bodies, but I must confess that the finding of a non-opaque foreign body may be at times very difficult.

Regarding the treatment of bronchiectasis, the procedure is mainly upon general lines and the surgeon must be careful to avoid as a routine the use of respiratory sedatives; rather should he use stimulating drugs. Probably the best method of treating children is by means of the creosote vapour bath. Drainage by posture is in certain cases an excellent method of emptying the cavities and it should be used in all cases as a routine, but it is necessary to know definitely the position of the cavities in the chest and also their outlets into the bronchi. Such drainage by posture should be performed frequently throughout the day.

In discussing the question of the treatment of such cases in the Hajek clinic at Vienna and watching the evolution in the technique employed by such men as the world-famed bronchoscopic expert, Haslinger, during visits to that institution in 1923, 1925 and 1926 it was surprising to see how the bronchoscope had been practically given up as a means of drainage in these cases. During a discussion with Dr. Haslinger the latter pointed out that if local analgesia were used to prepare the patient, the coughing *et cetera* associated with



FIGURE X.

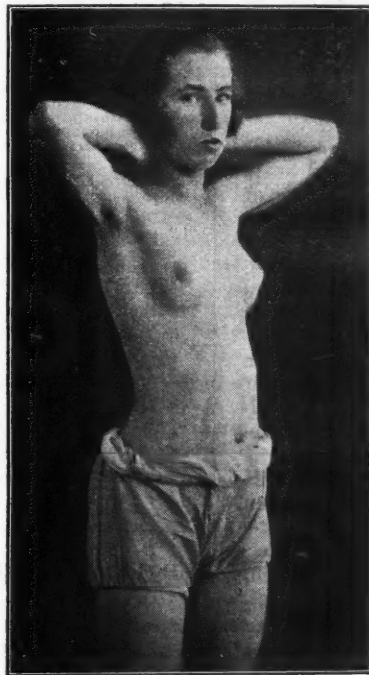


FIGURE XI.



the application of the cocaine to the larynx emptied the bronchiectatic cavities of their contents and this was the reason, he explained, how frequently empty cavities were found when they were entered. However, to be of any use in the treatment of these cases, the bronchoscope must be used regularly and very frequently. The regular frequent use of a general anaesthetic for treatment in this type of condition is, therefore, unjustifiable. Lavage through the bronchoscope and the application of antiseptic drugs *et cetera* have not proved of any great value and therefore such procedures in Vienna, at any rate, seem to be gradually being discarded.

Perhaps the group which shows the best results is that of cases of bronchiectasis which are due to the presence of foreign bodies. In these cases the manner in which the symptoms and the pus clear up, is remarkable. This is well illustrated in the X rays of the chest (see Figures I and II).

In concluding, I would like to state that these cases of bronchiectasis in children (and I have seen it in as young a child as four years of age) are becoming more and more common and as the state of these children, if the condition is allowed to drift on, becomes pathetic, I would plead that more care be taken to eliminate the presence of bronchiectasis, acute or chronic, in all children suffering from chronic coughs.

#### Acknowledgment.

I am deeply grateful to Dr. Val. McDowall for the excellent X ray films and for his considerate cooperation during the various in-

jections of "Lipiodol" which were done in his X ray rooms. Without such cooperation it would have been impossible to have had such results.

#### References.

<sup>(1)</sup> Pirie: *American Journal of Roentgenology*, December, 1926, Vol. XVI, page 553.

<sup>(2)</sup> Negus: "Joint Discussion on the Treatment of Chronic Non-Tuberculous Infection of the Lung," *Proceedings of the Royal Society of Medicine*, March, 1927, page 731.

<sup>(3)</sup> Chandler and Young: "Lipiodol in Pulmonary Diagnosis," *The British Medical Journal*, February 5, 1927, page 228.

#### LEGENDS TO ILLUSTRATIONS OF ARTICLE BY DR. GRAHAM BROWN.

Figures I to IV are X ray photographs of bronchiectasis in a girl, aged twelve and a half years, which was secondary to a tack in right lower bronchus. There was a history of inhalation of a foreign body ten years previously. The girl was very poorly developed and was very backward. She gave a history of chronic irritating cough, especially upon lying down. The cough on occasions lasted for a week at a time almost incessantly.

Figure I is a view taken from behind; it shows a tack in the right lower bronchus. Note the "drowned" condition of right lower lobe. The right diaphragm was fixed and poorly defined.

Figure II shows a view taken from behind two days after dislodgment of the tack. Note the marked clearing of upper part of right lower lobe.

Figure III shows a view taken from behind after injection with "Lipiodol" via the glottis. This shows the extent of the bronchiectasis. Note the "bunch of grapes" appearance, also the various forms of cavities.

Figure IV shows a lateral view of same injection. It shows that bronchiectasis is in the posterior half of the lower lobe. Figures III and IV emphasize the importance of both antero-posterior and lateral views being taken. They also demonstrate the easiest route taken by "Lipiodol" when injected in a sitting-up position, that is, to the posterior part of right lower lobe.

Figure V is viewed from the front. It shows normal appearance after injection of the middle lobe of the right lung. The lower lobe had been injected at a previous sitting and some "Lipiodol" can still be seen in the bronchi.

Figure VI is viewed from behind. It shows chronic bronchiectatic cavities in the right lower lobe. Several varieties of dilated bronchi are seen, and some cone-shaped ends and some concave ends suggesting distal dilatation into which the "Lipiodol" has not entered on account of the presence of pus in the cavities preventing its entry or on account of the openings being three millimetres or less in diameter.

Figure VII is viewed from behind. This illustrates a case of definite cavity formation at the right base.

Figure VIII is an anterior view. It illustrates the "glove" appearance in a well marked case of bronchiectasis in left base. Note the "cylindrical" enlargement of bronchioles and the club-shaped and other terminations of the "Lipiodol." Note also some general pronounced dilatation of the right main bronchi. There is only a little "Lipiodol" in the right side.

Figure IX, showing a boy, aged eleven years.

Figure X, showing a girl, aged eight years.

Figure XI, showing a girl, aged twelve and a half years.

Figures IX and X show the full development of the upper jaws and as far as the head and neck are concerned, the appearance of "robust" build. The body of the boy, however, shows a poor chest development; in the girl this feature is not quite so pronounced. Figure XI is of a girl who had inhaled a foreign body (tack) which had remained in the right lower bronchus for over ten years (see Figures I to IV). She had definite adenoids, much enlarged tonsils and secondary nasal obstruction. She has typical adenoid facies. Her antra are clear. These last three figures illustrate the point which has been raised, that is, it is in the first place essential for air to pass through the nostrils in sufficient amount to develop the upper jaws normally, but when pus has been in the antral cavity for any considerable length of time, the tendency is to an over-development of the width of the face, whereas in the case of adenoids where the normal respiratory stimulus has been deficient, there is an interference in the normal development of the upper jaws which results in a narrowing of the face.

#### CARDIAC PAIN.

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It is often very difficult to diagnose the cause or estimate the clinical significance of pain over the præcordium. The diagnosis is usually easy when the patient complains definitely of pain over the heart, produced by exertion, but there are many cases in which the connexion between the pain and the exertion is difficult to ascertain. The typical anginal seizure with pain over the præcordium, extending down the left arm and generally accompanied by a feeling of impending dissolution, is quite easy to diagnose, especially if there are physical signs of cardiac trouble present.

Now many patients complain of a slight pain, more or less constant over the præcordium, which may or may not be connected with exertion. In these cases diagnosis is often very difficult and it is the duty of the physician to do all in his power to ascertain whether the pain is of cardiac origin or not.



Numbers of us have played for safety at times and condemned to chronic invalidism patients who are really suffering from a disturbance in no way connected with the heart. At other times we have disregarded Nature's warning, causing disaster to the patient. The following is illustrative of the above.

About twenty years ago there lived close to me a lady of about thirty years old. One night while in bed she was seized with pain over the heart. Next day she consulted her medical attendant who informed her that there was nothing whatever the matter with her heart and not to worry about anything; the next night she dropped back dead in bed.

About a week after this occurred, a well known business man consulted me early in the morning, stating that while dressing he had experienced some pain in his chest and his wife had insisted that, before he went to town, he should consult a medical man. The patient had never been ill in his life and never had reason to consult a doctor. Most careful examination and inquiry into his history revealed nothing abnormal. There was no sign whatever of cardiac distress and the systolic blood pressure was only 146 millimetres of mercury. Having the catastrophe that happened to my *confrère* before my mind, I decided to play for safety; I warned the patient against going to town and advised him to go home to bed. This he did, but at about half past two in the afternoon he insisted upon getting up and dressing and while putting on his shirt he dropped back dead.

For many years I have watched patients with præcordial pain, seeing some die of cardiac trouble and others gradually develop definite signs of cardiac disease, while others still have got quite well.

To enter into the causes of cardiac pain would take too long and as the subject is still under dispute, not much would be gained. Yet there are certain facts that should be mentioned.

Mackenzie states that the causes of cardiac pain are either insufficient blood supply to the cardiac muscle or disease of the heart muscle and that there is always some disease of the heart as a whole or of the coronary vessels. With regard to angina Clifford Allbutt denies that the pain is due to diseased heart muscle and states that the pain is due to distension of the suprasigmoid portion of the aorta in which the two inner coats have been damaged by inflammation. The outer coat which has an abundant nerve supply, is overdistended and this portion of the aorta is very sensitive to pain.

To put the matter shortly, we may say that cardiac pain is the cry of a heart in distress.

The types of cardiac pain are as follows:

1. Mild discomfort.
2. More or less constant ache.
3. Anginal seizures, varying in severity. These may be divided into three groups: (a) angina following directly on exertion or emotion, (b) angina where there is considerable delay between the onset of the pain and the exertion or emotion, (c) angina where no relation between exertion and pain can be elicited.

When a patient, complaining of præcordial pain, presents himself for examination, very careful note should be made of the type of pain and its dis-

tribution and also its relation to effort, emotion and exposure to cold. The question of how and when the pain first started is of the utmost importance. Inquiries should be made as to whether there has been any rheumatism, chorea or syphilis and what is the patient's response to effort.

When examining the patient, think anatomically, that is, consider the structures one by one that may give rise to this pain from without inwards, following them as if you were at the end of a stylet, being driven right through the chest from the anterior surface to the posterior surface. If you do this, there is very little chance of your missing anything, especially if you have in your mind the nerve distribution of the spinal segments corresponding to the internal organs.

When examining the skin, see if there is any hyperæsthesia; this is best determined by stroking the corresponding areas on both sides of the chest with a piece of paper about 7.5 centimetres (three inches) long and comparing the sensation. Remember that pain and hyperæsthesia may arise in heart disease in the areas supplied by the following nerves, the lower branch of the fifth cranial, the second and third cervical and the eighth cervical to the fourth thoracic nerves. That is, we may have the jaw, neck, chest or inner side of left arm affected.

Do not forget that there may be pain before an herpetic eruption appears and that the pain may continue for many months after the rash has disappeared. With regard to the nerves, note whether there is any tenderness where the nerves emerge from the muscle.

When examining the muscles for general tenderness, do not acquaint the patient with what you are doing, as the neurotic very often says that there is tenderness when it is suggested to him. If tenderness is elicited independently of suggestion, it will largely corroborate the patient's statement of pain. Further examination should be taken to exclude any fibrositic nodules.

The bones should be examined for swellings, the pericardium for friction. With regard to the pleura the pain has relation to the respiration. New growths in the mediastinum are determined by percussion, pressure symptoms or X ray examination. Pain arising from the cardiac end of stomach is of a gripping, burning character situated behind the sternum and is generally relieved by a large dose of bicarbonate of soda.

Disease of the vertebræ, causing pressure on nerves and pain situated at some distance from the seat of the trouble, can nearly always be cleared up by examination of the spine for tenderness or immobility and if necessary further examination by means of X rays.

There are certain constitutional diseases, for example, syphilis with subsequent tabes, which may give rise to discomfort and tightness around the chest.

Toxæmias such as tobacco may give rise to præcordial discomfort or even acute pain, but this will be discussed later. Diseases of the breast can be eliminated by examination and the neuroses only

by the most careful examination and last and not least diseases of the aorta.

There are certain facts which help in the diagnosis of cardiac pain. As I mentioned before, the most notable characteristic of pain due to cardiac disease is that it is brought about in many cases by exertion. Unfortunately it is at times exceedingly difficult to determine the relationship between the exertion and the pain. A fact to remember is that the pain may not arise until a good many hours after the exertion and further, that the pain may follow only after a summation of efforts. It may not appear on Monday, but gradually makes its appearance on Tuesday and goes on increasing until the end of the week and then the rest on Saturday and Sunday may relieve the pain. Vaquez points out a very useful diagnostic point, that if exercise be taken after a big meal and pain is produced, the condition is in all probability due to cardiac trouble. Yet these conditions do not present the difficulties in diagnosis as when there is a constant dull ache over the præcordium.

To call præcordial pain false angina when we cannot determine its cause, is wrong. It is only a cloak for our ignorance and explains nothing at all.

Potain pointed out many years ago that there is no false angina, only false diagnosis. Grave angina mostly affects patients over forty-five years old, while ordinary cardiac pain is more often found in those that are younger. *Angina pectoris* is usually situated in the upper part of the sternum, while cardiac pain is generally lower down, yet both forms may radiate in the same direction.

The condition of the heart muscle may be determined in the majority of cases by inquiry concerning the amount of dyspnoea on exertion. Yet patients may be obese and the pain may be in no way connected with heart trouble. Again a patient may never have taken sufficient exercise to determine his cardiac reserve and, furthermore, as Mackenzie points out, there are cases in which the response to effort is quite good, that is, there is no dyspnoea on exertion, yet nevertheless there is cardiac pain.

Tobacco smoking will often cause pain situated in the upper part of the sternum. Here a history of excessive smoking in confined rooms will very often be elicited and often a peculiar form of insomnia is present in which the patient goes off to sleep alright, but wakes up in the early hours of the morning and cannot get to sleep again.

A previous history of rheumatism or syphilis is greatly in favour of the case being one of cardiac trouble. The presence of arteriosclerosis or a high blood pressure points in the same direction. The examination of the heart should be made most thoroughly and do not forget to try the pulse for *pulsus alternans*.

The position of the apex beat is very important and it is often exceedingly difficult to determine this. Yet if the following method, suggested by Heatherly, be adopted there will be very few cases in which its position cannot be determined.

Make the patient lie on his left side with his back towards you and palpate over the fifth left inter-

space and then instruct him to take a few deep breaths when the apex beat will be felt. Mark the position of the apex beat and then turn the patient upon his back and allowing 1.25 centimetres (half an inch) for the outward swing of the heart, the apex beat will be 1.25 centimetres internal to the place marked.

Hyperæsthesia must be tested for by the paper method mentioned before and by rolling the skin between the fingers. Percussion may not reveal very much except when there is a definite aneurysm. Auscultation often reveals a considerable amount, but beware of missing a mitral stenosis; the area of the murmur is often very circumscribed and at times there is no murmur at all. The first sound becomes short and sharp and it may easily be mistaken for a second sound. So always palpate the apex beat when listening to a murmur so that the first and second sound may not be misplaced.

I have not gone to any length in describing the methods of examination, but have only pointed out where errors may and do arise.

We now come to those cases in which careful questioning and examination leave us in doubt as to the cause of the pain and whether there is cardiac trouble present or not. It is in these cases that electrocardiographical examination is often of enormous value. Here I particularly want to point out that in those cases in which there is true cardiac pain, even though the heart is quite normal in size and free from murmurs, at least 70% of patients will give abnormal electrocardiograms, showing that some of them are suffering from coronary narrowing and others from block of the bundle of His or its branches *et cetera*.

Those patients who have cardiac enlargement and symptoms of circulatory insufficiency and who are really suffering from a diffuse myocardial degeneration from arterial narrowing or from multiple foci of low grade infection within the muscle, give abnormal cardiograms in about 85% of cases.

The electrocardiogram will also demonstrate hypertrophy of the auricles and comparative enlargement of the right or left ventricle. It will verify the presence of a mitral stenosis and determine the presence of a heart block long before it is suspected and besides elucidating the irregularities, it will show up lesions of the bundle of His which cannot be determined by any other method.

The following are the notes of some cases in which diagnosis has been very difficult, and the matter has been cleared up by means of the electrocardiogram.

CASE I.—J.A.B., aged forty-five years, a labourer, was referred to me by Dr. Collins. He complained of pain in the chest which came on twelve months ago after lifting a heavy weight. The pain is worse at night and gradually gets worse during the week. The pain improves when he takes things easily on a Saturday and Sunday and by Monday he is comparatively free from pain.

Examination shows him to be a sensible, broad-chested man. The apex beat was ten centimetres (four inches) from the mid-line and on exertion there was a reduplication of the first sound in the mitral area. The systolic blood pressure was 140 and the diastolic pressure 90 millimetres of mercury. Exercise toleration was normal. Electrocardiographic examination revealed a condition of early heart block.

This condition was undiagnosable without the electrocardiograph and showed that the weight lifting had nothing to do with his disease, but brought his cardiac condition to light.

CASE II.—T.A.W., aged fifty years, a packer, was referred to me by Dr. Molesworth. He had syphilis when a boy and has been under treatment for the last three years for the same. He complained that five weeks ago while walking up a hill he experienced some discomfort over his præcordium which lasted for about five minutes, since this he has had little attacks from time to time which come on irrespective of rest or exertion.

Examination showed the apex beat to be in normal position. The pulse rate was 86. The systolic blood pressure was 130 and the diastolic 90 millimetres of mercury. Exercise toleration was normal. The electrocardiogram showed a comparatively low voltage of *R* waves in Leads 1 and 3 with slight notching of *R* in both these leads, inverted *T* wave in Lead 1. From this we may surmise that there is myocardial degeneration.

This condition quite probably would have been diagnosed as one of cardiac disease, but outside the history there is nothing definite to prove it except the electrocardiogram which shows that he has some myocardial degeneration.

CASE III.—R.C., a female, aged thirty-two years, complained of pain over the præcordium, a weak chest with cough and colds following upon influenza about two years ago. She was in the Coast Hospital nine months ago, suffering from pleurisy and pneumonia. Following on this she had some breathlessness on exertion. She had a persistent cough with a fair amount of sputum. She has been attending the Anti-Tuberculosis Dispensary for five weeks and this department, not being satisfied that she had tuberculosis, sent her in for diagnosis.

Examination revealed a pulse rate of 112. The breath sounds were harsh all over the chest and a doubtful rub was present in the right axilla. The spleen was palpable. The apex beat was 8.75 centimetres (three and a half inches) from the mid-line. The heart sounds were regular and the first sound in the mitral area was slapping and there was the suspicion of a presystolic murmur and there was slight swelling of the ankles, yet none of these signs was so definite that an examiner could be certain of it.

The electrocardiogram shows the following *P* is large and notched in Lead 2. In Lead 1 *R* is small and *S* is exaggerated and *R* in Lead 3 is exaggerated, *S* almost absent. From this we may surmise that there is some

hypertrophy of the auricles and a predominance of the right ventricle.

On the evidence of the physical and graphic examination the diagnosis of mitral stenosis was made. This subsequently was proved to be correct for the patient was admitted three months afterwards with well marked signs of mitral stenosis.

Lastly I show the electrocardiograph taken from a patient suffering from coronary occlusion (see accompanying figure).

This is a rather exaggerated form of graph of what is often obtained from patients with coronary sclerosis. Note the upward curving of the *S-T* interval in all leads particularly in Leads 1 and 3. There is also an inversion of the *T* waves in all the leads. It is hoped that this case will be fully recorded at a later date.

## Reports of Cases.

### SINUS INFECTION BY FUSIFORM BACILLUS AND SPIRILLUM.

By HUBERT M. JAY, M.B., B.S. (Adelaide),  
Honorary Aural Surgeon,  
Adelaide Hospital.

THE following case has seemed to me of sufficient interest to report, in that I can find no similar record in the literature beyond the mention by Hajek in his "Nasal Accessory Sinuses" of the occasional occurrence of the fusiform bacillus and *Spirochæta refrigens* in sinusitis.

In the case which is the subject of this communication the extreme virulence of the attack and the consequent destruction of the intranasal tissues place it far before ordinary sinus infections in importance and in the unpleasantness of its after effects.

The early records are taken from hospital notes and are rather sketchy.

#### Clinical History.

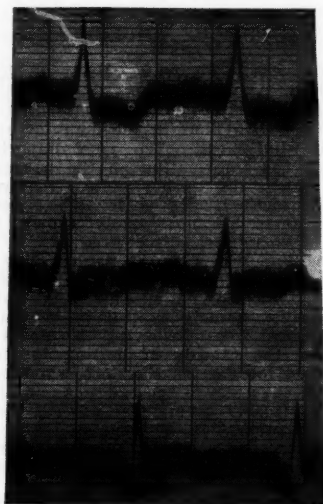
The patient, H.F.M., aged twenty-nine years, complained in June, 1919, of "trouble in the nose and expectoration." He had had a cough after being gassed in 1918 and was still troubled by it. He always seemed to have a "cold in the nose." The notes state that no tubercle bacilli were found in the sputum and a rhinologist reported that there was a "chronic inflammation of adenoid patches in the pharynx." Mucopurulent expectoration was present. There were a few scattered rhonchi in the lungs. The specific gravity of the urine was 1030. It contained neither albumin nor sugar. The heart sounds were normal. He was discharged in August, 1919, with a diagnosis of "bronchitis."

In May, 1921, an examination was made by another rhinologist who reported a pharyngitis, "probably due to over indulgence in tobacco."

In June, 1926, I first saw him. On examination the nose was roomy; the naso-pharynx was wide and inflamed. Some pus was visible in the left middle meatus. With the rhinoscope, pus could be seen pouring from the left antral ostium and there was a suspicion that the right sphenoid was infected. The left antrum was dull on transillumination and the septum was considerably deflected to the left.

The X ray report was as follows:

Relative opacity of left antrum suggesting chronic purulent sinusitis. There appears to be some thickening of the walls of the right antrum, though its lumen is clear. Frontal sinuses are small, right side hazy,



Electrocardiograph of Dr. Lidwill's Last Patient.



chronically infected. Sphenoidal sinuses large and clear.

On February 5, 1926, operation was performed under ether anaesthesia. The septum was resected to facilitate drainage. Bilateral anastomy was performed. The right middle meatus was draining well and the fronto-nasal duct was clear, so nothing further was done to aid the drainage of the frontal sinus. Gauze soaked in compound tincture of benzoin and paraffin was introduced to support the septal flaps and it was left in for twenty-four hours.

Following the operation the patient suffered severely from headache. The packing was removed from the nose on the morning following operation, but this gave him no relief. The following are some brief extracts from hospital notes:

On February 7, 1926, the face was swollen. An offensive smell emanated from the nose. The temperature was 37.9° C. (100.2° F.). The pulse rate was 92.

On February 9, 1926, the face was still swollen. The throat was sore and headache was severe. The temperature was 38.3° C. (101° F.).

On February 10, 1926, he was very uncomfortable and complained of headache and stuffiness. Nasal discharge was free. The temperature was 38.5° C. (101.4° F.). The pulse rate was 100.

On February 11, 1926, he both looked and felt a very sick man. The appearance of the nasal cavities was most unusual. The tissues were so swollen and oedematous as to close completely the passages and there was a profuse, foul, mucoid discharge with flecks of pus. Cocainization had practically no effect on the airway and the impression given was that a highly irritating chemical substance had been introduced into the nose. Examination of the materials used in the nasal packing set my mind at rest on this point, so a bacteriological examination of the nasal secretions was made. The report was that spirochaetes and fusiform bacilli of the Vincent type were present. No diphtheria bacilli were found. He was treated by means of a campho-menthol ointment in the nose, a douche containing *liquor thymol compositus* and a nasal spray of a 5% solution of sulphate of copper.

On February 18, 1926, headache had been severe and continuous, but on this day he went out into the sunshine for the first time. From this date onwards his condition improved more rapidly.

On February 23, 1926, he was given an intravenous injection of "Arsphenamine" and this was continued until April 4, 1926.

On March 8 the secretion had greatly moderated and the nasal cavities were becoming crusty. His general condition was improving, but he still looked and felt ill.

On March 15, 1926, his condition was not so good. Much thick secretion and a large septal perforation were visible.

On March 18, 1926, a laboratory report stated that no spirochaetes or fusiform bacilli were present in a smear. He was still having injections of organic arsenic compounds and on April 12, 1926, a similar report was received from the laboratory.

The final state of this patient when seen on April 15, 1926, was as follows: The whole of the septal mucosa left by the removal of the septal cartilage and bone, had vanished as the result of the ulceration. There was contraction and collapse of the alar cartilages, especially on the right side where there was almost complete closure. There was considerable atrophy of the inferior turbinates and the naso-pharyngeal wall was plainly visible. The middle turbinates and ethmoids were hyperplastic and there was a definite tendency to crusting all over the nasal cavities.

He was ordered a spray of pepsin and glycerine and beyond suffering from a crop of furuncles on the neck and face and occasional headache, has kept well up to the present time. His cough is still present and on examination of his sputum on July 11, 1927 (a year later), no tubercle bacilli, spirochaetes or fusiform bacilli were detected. Streptococci were present.

Since these notes were written the patient has returned complaining of severe right-sided headache. Pus was found to be coming from the right fronto-nasal duct and there was fluid pus in the sphenoid-ethmoidal recess. On September 23, 1927, the right fronto-nasal duct was rasped out and the sphenoid opened and found to be full of pus.

## OPEN REDUCTION OF SUB-CORACOID DISLOCATION OF SHOULDER NINE WEEKS AFTER INJURY, FOLLOWED BY COMPLETE RECOVERY.

By C. E. CORLETTE, M.D., Ch.M.,

Surgeon to the Sydney Hospital; Lecturer in Clinical Surgery, The University of Sydney.

J.R.J., aged thirty-seven, was admitted to the Sydney Hospital, July 26, 1919, complaining that he was not able to use his left shoulder. He stated that eight weeks previously he had fallen from a horse on to his flexed elbow. Following this he had much pain and swelling about the left shoulder. He saw a doctor and was treated by "over-head exercise." Owing to restriction of movement he came to Sydney for further treatment.

On examination, the acromion was found to be very prominent and the shoulder depressed. The proximal part of the arm was close in, but the limb was held rigidly in abduction. A ruler placed on the lateral aspect made contact with the acromion above and the lateral epicondyle below. The circumference of the affected shoulder was 2.5 centimetres (one inch) greater than on the unaffected side. He could touch the tip of the right shoulder with his left hand. The X ray report disclosed subcoracoid dislocation with fracture of the greater tuberosity.

On July 30, under ether anaesthesia, an attempt was made to reduce the dislocation by Kocher's method and by the heel in the axilla. The attempt failed.

On August 6, an open operation was performed under ether anaesthesia. A vertical incision was made anterior to the joint and the glenoid cavity and head of the humerus were inspected. No manipulation succeeded in obtaining reduction until a powerful steel lever (Lane's) was introduced, and by this means the head of the bone was successfully levered on to the edge of the glenoid cavity and then replaced in its natural position. The operation was extremely difficult. All parts of the capsule, as far as recognizable, were brought together with catgut sutures, and the wound was closed. Healing proceeded by first intention. When the wound was healed, he was treated by passive movements and massage. He was discharged from the hospital on September 16.

Recovery was complete. I have seen him at various times since. He has perfect movement in the shoulder joint, free in every way. He says it has never caused any trouble, and is as good as ever it was.

## Reviews.

### THE USE OF WHOLE-MEAL.

"WHOLE-MEAL WITH PRACTICAL RECIPES" by Ettie A. Hornbrook is of special interest to Australians in the light of cables in the newspapers concerning the use in England of Australian flour in the manufacture of a new biscuit-loaf of whole-meal.<sup>1</sup> The most important feature of the book is the information on the baking of whole-meal bread which, the author states, requires a modification of the method adopted for white bread. It is because these facts are not widely known, that whole-meal bread is sometimes discredited; it is merely the method of baking which is at fault. The arguments against whole-meal flour are dealt with in another chapter, but there is no mention of one difficulty which appears to be considerable, namely that it is extremely difficult to keep whole-meal free of weevils. No doubt the author would advocate the remedy of milling the wheat grain as it is required for use, as she does when she mentions the tendency of the germ to "go bad." As an alternative to using the flour freshly ground she advises the separation of the germ, preservation by heat and remixing. Presumably the increased cost of either procedure would be offset by the economic value of the improved health resulting from the use of whole-meal bread.

<sup>1</sup> "Whole-meal with Practical Recipes," by Ettie A. Hornbrook; 1927. London: William Heinemann (Medical Books), Limited. Demy 8vo., pp. 78. Price: 1s. 6d. net.

## The Medical Journal of Australia

SATURDAY, OCTOBER 8, 1927.

### The Practice of Preventive Medicine.

THE "Review for 1926" of the Rockefeller Foundation is a document that should be on the table in every medical practitioner's home. It should be studied with care; marginal notes should be made during its perusal to indicate how far the doctrines elaborated are applicable to conditions obtaining in the Australian States or districts within individual States. It will be found that some of these doctrines can be modified or extended to suit local requirements. There is one sentence, however, which might have been differently expressed or to which a qualification might have been added. It is as follows: "The triumphs of preventive medicine are widely acclaimed." It is unwise for any one to regard his work with satisfaction. Conscientious scrutiny and frank criticism will reveal that nearly every achievement could have been better. The progress in preventive medicine reads well, but we are justified in maintaining that the real triumphs are few and that theory remains a long way ahead of practice. Dr. George E. Vincent points out that variola is almost unknown in parts of Europe and in a few of the United States. Adequate vaccination and careful control are such effective weapons that smallpox should be quite unknown in all civilized countries. He states that typhoid fever epidemics are rare in efficiently administered communities. On the other hand it must be admitted that enteric fever is far too prevalent in almost every country. Where it exists, there is usually evidence that a sufficiently large sum of money has not been expended on the safe disposal of excreta. Again he writes that tuberculosis is decreasing among many populations. Is this a result of prophylactic measures or is it one of those strange variations in the incidence and mortality of diseases that have been noted ever since epidemiology has been studied? Australia is held to

be favourably placed in regard to tuberculosis and yet approximately one person dies of this disease each year in every two thousand of the community. In the next place he finds that diphtheria is coming under control. We have called attention on many occasions to the deplorable fact that although the causal organism of diphtheria is known and can be readily recognized, the incidence in Australia remains high. There can be no proud boast when one person in every five hundred falls a victim to a disease held to be preventible.

Dr. Vincent rightly points out that the work of preventive medicine to be successful must be undertaken by a composite army of enlightened people. He enumerates doctors, investigators, health officers, sanitary engineers, statisticians, accountants, clerks. He gives the first place to research and would keep open intercourse between those engaged in research work in all centres throughout the world. He continues by stating that in the second place the medical profession must be intelligent and sympathetic. He realizes that the general practitioner in any country can make or break a public health programme. It is he who diagnoses maladies, reports communicable diseases, educates his patients, makes health examinations, gives advice about personal hygiene and influences public opinion. Dr. Vincent could have gone further. If the general practitioner is prepared to collaborate with the health authorities, he can gather much valuable information concerning the presence in a given environment of factors which may have ætiological relationship with certain disease; he can watch those who have been in contact with persons suffering from infective diseases, and, when necessary, attack sources of infection while they are limited in extent; he can take part in any planned experiment to gain the mastery over preventible diseases; he can apply immunizing measures to every member of a household in the presence of infection in the district.

It is now nearly three years since the Federal Committee of the British Medical Association in Australia published the Hone-Newland report on the cooperation of the medical profession with the Commonwealth Department of Health. In this report

and in the resolution passed by the Federal Committee at its meeting in February, 1925, the suggestion was embodied that the general practitioner should be linked up into active participation in the administrative scheme of the control of the public health and that the ideal of prevention should be steadily inculcated into both the actively administrative and actively practising members of the profession. Since then the Royal Commission has issued its valuable report. The Commissioners recommend that for a State model health administration medical practitioners should have definite prescribed duties in connexion with public health and prevention of disease, to be carried out under the supervision of and in cooperation with the district medical officer. While progress has been made in the institution of a working scheme for the more adequate control of infective disease by the establishment of the Federal Health Council last year and by other measures for the coordination of the State Departments of Public Health, nothing has yet been done to enlist the active cooperation of the general practitioner. Dr. Vincent's requirements should not be difficult to fulfil. We can claim that the general practitioner in Australia is both intelligent and sympathetic, that is in sympathy with the conception of preventive medicine. Whether his sympathy is strong enough to induce him to allot a substantial proportion of his time and energy to this work remains to be seen. If he fails, the prospects of successful prevention of disease will be poor indeed.

### Current Comment.

#### PERIARTERITIS NODOSA.

OWING to the fact that the majority of cases of *periarteritis nodosa* are not recognized prior to autopsy, most reports of this condition have been made by pathologists. For this reason it is possible that sufficient emphasis has not been laid on the clinical manifestations. In October, 1922, the clinical symptoms, the *post mortem* appearances and the different views on the aetiology were discussed in these columns in connexion with a communication by Harris and Friedrichs. A few months later Cleland, of Adelaide, reported a case occurring in the Adelaide Hospital, in which the diagnosis was made at autopsy. It is important to remember that the arteries of one part of the body may be affected

to a much greater degree than those of another part. When the subcutaneous vessels are affected, nodules are palpable and the associated tenderness makes it much more probable that a diagnosis will be made than when, for example, the vessels of the alimentary canal have borne the brunt of what must be regarded as an infective process. Cleland pointed out that *periarteritis nodosa* is commonly considered under the caption of diseases of arteries and that such diseases are usually looked upon as being of a more or less local nature. He holds that as long as *periarteritis nodosa* is thought of as being such a local disease, cases are likely to be missed. The condition is obviously the result of a general infective process. It will be remembered that Harris and Friedrichs produced experimental evidence which tended to show that the causative agent is a filter-passing virus. Whether this is so has not been proved, but the fact remains that the patient in the early stages sometimes manifests symptoms which may be mistaken for enteric fever or acute miliary tuberculosis. The type of symptoms will naturally depend on the point at which arterial involvement is greatest. In these circumstances it is well to consider a recent report of two cases by H. A. Singer.<sup>1</sup>

The first patient was a coloured man, aged twenty-nine years, who complained first of all of anorexia and constipation; this was followed by colicky epigastric pain, sometimes associated with vomiting. Deep jaundice supervened, together with attacks of epistaxis and melena. The attacks of pain in the upper part of the abdomen became so severe that a diagnosis of cholecystitis was made. In spite of severe secondary anaemia it was considered that surgical operation should be undertaken. At operation it was seen that the duodenum was distended with blood and the gall bladder which was similarly affected, was removed. Examination of the gall bladder led to a diagnosis of "infectious arteritis with multiple aneurysmal dilatations and consequent thromboses." Three months later the patient was readmitted with symptoms of myocardial insufficiency and died within twenty-four hours. The condition was recognized as *periarteritis nodosa* at autopsy. This history is instructive. At operation a diagnosis of Henoch's purpura was made. Henoch's purpura is closely allied in nature to erythema and urticaria; it is really a member of the angio-neurotic group. It is easy to be wise in the light of subsequent events, but cholecystectomy seems strange treatment for a condition which is a neurosis. Perhaps the presence of adhesions round the gall bladder was the determining factor. The pain associated with Henoch's purpura may be extremely severe. Millard has reported in this journal the history of a patient who was subjected to exploratory laparotomy on account of acute abdominal symptoms. In his case, however, although sanguineous fluid was found in the peritoneal cavity and the gut generally was acutely inflamed, dark and congested, the condition of appendix and gall bladder did not warrant the removal of either. The

<sup>1</sup> *Archives of Internal Medicine*, June 15, 1927.



fact that the condition of Singer's first patient was not recognized even when the gall bladder was examined, demonstrates the necessity for remembering the pathological picture produced by *periarteritis nodosa*.

The second patient described by Singer was a man, fifty-seven years of age, who complained of symptoms, referable mainly to a decompensated heart. The symptoms and results of clinical examination led to a diagnosis of old nephritis with secondary hypertension and myocardial insufficiency. After treatment he recovered for a time and was readmitted on account of dyspnoea. He then complained of severe pain in the upper right quadrant of the abdomen which was accompanied by tenderness, rigidity and distension. Jaundice appeared and surgical treatment was withheld owing to the patient's mental condition. He became weaker and in addition to signs of nephritis, abdominal symptoms and delirium manifested signs of polyneuritis. He died in coma. A diagnosis of *morbis incognitus* was made. Autopsy revealed typical *periarteritis nodosa*.

Kroetz divides the clinical manifestations of *periarteritis nodosa* into two groups, constitutional and local. The constitutional symptoms are those of an infective process and the local symptoms depend on the system or organs involved. Singer points out that a conspicuous feature of the disease is a high grade secondary anaemia and that when this is associated with progressive asthenia and emaciation, it gives the patient the appearance referred to in the original description of the disease by Kussmaul and Maier as chlorotic marasmus. P. S. Meyer considered that chlorotic marasmus, polyneuritic and polymyositic symptoms and gastro-intestinal manifestations formed a triad of syndromes in this disease. To these three others have added nephritis.

The record of Singer's two cases serves to indicate the difficulty which surrounds diagnosis in this obscure condition. There can be no doubt that Cleland is right in his contention that many cases go unrecognized. It will be useful to remember Eden's dictum, referred to by Singer, that in an obscure condition, having the characteristics of a low grade sepsis in regard to which no information can be obtained by bacteriological examination, and which cannot logically be classified as one of the more important conditions, the possibility of *periarteritis nodosa* should be entertained and a search made for nodules in the skin. It is probable that but little progress will be made until the pathogenesis is understood, but careful clinical and pathological observation will help to attain this end.

#### AN EXPEDITION TO THE GREAT BARRIER REEF.

It was announced in THE MEDICAL JOURNAL OF AUSTRALIA of August 12, 1927, that Mr. E. F. Pollock, a member of the Council of the Royal Zoological Society of New South Wales, has organized an expedition for bird lovers and naturalists to the Great Barrier Reef. The party will leave Sydney

on November 13, 1927, and will travel by rail to Bundaberg, Queensland. The further details have been published in the previous announcement. A second excursion has been arranged for school teachers and others to leave Sydney on December 27, 1927.

It is anticipated that the weather will be entirely favourable; it is nearly always so at this time of the year. The breeding season of many kinds of sea birds and turtles occurs then; these birds abound on these atolls. Corals and coral animals will attract many students of marine zoology; while the large game and other fishes will form attraction to anglers. Mr. Pollock is most enthusiastic about the bird and animal life on the Great Barrier Reef and is of opinion that everyone who has visited it, has been enraptured by the wonderful sight. We can advise those of our readers who are naturalists and nature lovers to write to Mr. Pollock (Carrington Avenue, Strathfield, near Sydney) to intimate that they will join the party.

#### PERIODICAL MEDICAL EXAMINATIONS.

In a recent issue we published a review of a book dealing with periodical medical examinations. It was pointed out in the review that arrangements are made by certain American life insurance houses to have their policy holders overhauled at intervals at the expense of the insurance societies, but that this plan was not in vogue in Australia. Our attention has been called to the fact that one society operating in Australia has followed the practice of offering to all holders of its policies of over £500 free medical examination every five years. The society is the Australasian Temperance and General Mutual Life Assurance Society, Limited. It has been found that the mortality among policy holders is appreciably lower within a period of five years after a thorough examination than it is among persons of the same age period not so examined. The experience of the society has been that the majority of policy holders avail themselves of this offer of quinquennial examinations and that the result is a definite improvement of the health of the persons examined and at times a definite postponement of death. The society instructs a medical practitioner to carry out a thorough examination, but informs the policy holder that no treatment will be given. The holder is informed of the result of the examination and advised to obtain treatment if necessary from his usual medical attendant.

The obvious advantage of this system has been discussed in these pages in the past. It is admitted that successful treatment of disease is often impossible unless a very early diagnosis is made and that even when the affection at an advanced stage is amenable to medical or surgical remedies, the earlier the treatment is applied, the less will be the harm inflicted on the patient. An insurance society that adopts such a system, gives evidence of its appreciation of the doctrines of preventive medicine.

## Abstracts from Current Medical Literature.

### THERAPEUTICS.

#### Diuretics.

R. R. SNOWDEN (*The Atlantic Medical Journal*, December, 1926) discusses the value of diuretics. Reliance has still to be placed on caffeine, theobromine, theocin, diuretin, squills and mercury. Calcium chloride by mouth has been used to promote diuresis, by endeavouring to replace the sodium ion in the blood and tissues. As calcium chloride irritates the stomach, ammonium chloride two grammes (thirty grains) given three times a day has been substituted by some clinicians. This drug is liable to cause sudden acidosis and dyspnoea in nephritis, when there is impairment of acid excreting function. Hence it should be used only in nephritis with oedema due to salt retention and in ascites without cardiac complications. "Novasurol," a mercurial drug, acts by renal irritation and is dangerous when there is any pronounced degree of nephritis; suppression of urine may occur. Intravenous injection of sodium hypophosphite may counteract this ill-effect. More heroic measures to promote diuresis are intravenous injection of twenty to one hundred cubic centimetres of 10% (hypertonic) salt solution or intravenous injection of one hundred to two hundred cubic centimetres of 4% glucose and 4% sodium bicarbonate solution. Heat in the form of high colonic irrigation at 120° is sometimes useful.

#### Oral Absorption of Calcium.

J. H. ROE AND B. S. KAHN (*The Journal of the American Medical Association*, April, 1927) have investigated the calcium content of blood at intervals following the ingestion of calcium salts under experimental conditions. They believe that the estimation of faecal and urinary calcium does not give an accurate measure of calcium absorption, since no definite relation can be established between the two excretory functions, nor do they bring into account the calcium absorbed from the small and excreted into the large intestine. The authors also consider the influence of food when ingested simultaneously with the calcium salt. Their investigations therefore consisted of blood-serum-calcium analyses at intervals of two hours following the ingestion of different foods (milk, carbohydrates, proteins) to which calcium lactate was added in varying amounts. The experiments were commenced after each subject had fasted for fifteen hours. Colorimetric methods were used in the investigations. The authors conclude that the calcium content of the normal fasting person is definitely elevated by the oral administration of calcium lactate in aqueous solution, the optimum

dose being five grammes. The simultaneous administration of food produces a definite depression of the absorption rate. Since this elevation can be produced orally by suitable means, intravenous therapy is not necessary.

#### Ephedrine.

S. S. LEOPOLD AND T. G. MILLER (*The Journal of the American Medical Association*, June 4, 1927) report the results obtained in asthma and hay fever by the administration of ephedrine. In nineteen cases of asthma of the allergic type, due to pollens, dust, dandruff *et cetera* complete immediate relief was obtained by giving twenty to a hundred milligrammes of ephedrine orally or subcutaneously. In thirty-seven cases of asthma due to infection in the paranasal sinuses (sphenoid-ethmoid especially) or elsewhere complete relief was obtained in fourteen instances and partial relief in sixteen. The less satisfactory results in these cases were attributed to the inflammatory changes present, in contrast to vasomotor swelling and spasm in the allergic type. Complete immediate relief was also obtained in three cases of reflex nasal asthma, that is asthma associated with mechanical difficulties in the nose. Eleven cases of hay fever were treated by oral administration of ephedrine, in five with definite benefit and in twelve other cases characterized by nasal troubles a similar treatment was found to cause shrinkage or pallor of the nasal mucosa in ten to sixty minutes. Palpitation, nervousness, tremor, nausea, insomnia; a feeling of constriction about the head and urticaria were untoward symptoms noted; in no case except the last were these symptoms severe enough to necessitate suspension of treatment.

#### Bromide Intoxication.

U. J. WILE (*The Journal of the American Medical Association*, July 30, 1927) describes eight cases of bromide intoxication with methods of determining such intoxication. Ingested bromide with difficulty passes the renal epithelium, it tends to be stored in the body and displaces the chloride ion, being itself easily liberated and excreted when physiological sodium chloride solution is injected intravenously. To liberate bromine from any body fluid such as blood, urine *et cetera*, a few crystals of potassium permanganate and a few drops of concentrated sulphuric acid are added, the fluid is agitated and filter paper, impregnated with fluorescein and moistened with dilute acetic acid, is held to the mouth of the test tube; escaping bromine combines with the fluorescein to form eosin giving a bright pink colour in contrast to the yellow of fluorescein. This test helps to establish a diagnosis of bromism. Three of the patients studied were affected by a toxic psychosis due to bromide ingestion and five cases exhibited bromide rashes. In one case bromine gas could be seen coming from the urine

and in two cases bromine could be detected by smell. In the others it was evident on applying the above test. In one psychotic patient the bromine was demonstrated by this test in spinal fluid, sputum, blood and gastric contents. In one instance albuminuria occurred, and it disappeared after intravenous injections of sodium chloride; the albuminuria may have been due to irritation of the kidney by bromine. In four cases intravenous injections of one hundred cubic centimetres to four hundred cubic centimetres of sodium chloride were given repeatedly, with complete recovery from the symptoms of bromism. Not more than four hundred cubic centimetres of sodium chloride solution should be given twice a week.

#### "Synthaline" in Diabetes.

H. CHABANIER AND M. LEBERT (*La Presse Médicale*, June 1, 1927) discuss the practical value of "Synthaline" in the treatment of diabetes. Frank and others have recently introduced this substance, synthesized from guanidin, which has an action by mouth similar to that of "Insulin" given subcutaneously. "Synthaline" was administered in nineteen severe and eight mild cases of diabetes. It is of no value in coma or just before coma occurs. In the first place "Synthaline" was given by mouth in doses of fifty to one hundred and fifty milligrammes in twenty-four hours, after the patients had been rendered almost sugar free by "Insulin." In seven cases the glycosuria recurred and symptoms of intolerance for "Synthaline" developed, namely anorexia, asthenia, loss of weight, nausea, giddiness *et cetera*. In ten other instances "Insulin" and "Synthaline" in small doses given together caused loss of appetite and depression, obviously due to the "Synthaline" since the symptoms were absent with "Insulin" alone. In the eight mild cases of diabetes anorexia and loss of weight were noted when "Synthaline" was administered alone. The conclusion is that "Synthaline" is of scientific interest, but not of practical value in the treatment of diabetes.

### NEUROLOGY.

#### The Significance of Mirror-Writing.

MACDONALD CRITCHLEY (*Brain*, March, 1927) defines mirror-writing as writing which runs in an opposite direction to the normal, each individual letter being reversed; the script is therefore illegible until held before a looking-glass. Spontaneous mirror-writing may appear chiefly in certain patients suffering from right hemiplegia (with left hand), certain normal children who are learning to write, some feeble-minded individuals and patients with congenital word blindness. Experimentally, it may appear in normal subjects on writing bimanually or on the forehead or on

the under surface of a board, and during states of inattention or partial obtusation of consciousness. It is probable that the writing employed by Leonardo da Vinci in his famous notebooks was the result of an apoplectic stroke. The theories that have been hazarded to explain mirror-writing are very numerous; briefly they are of two kinds—the physiological and the psychological. It appears, however, that no explanation is adequate which does not include both of these factors combined in different degrees in different cases. Physiologically abduction or centrifugal movements are the most natural for both hands, thus with the right hand a chalk line on the blackboard is drawn from right to left, a circle clockwise and reversely with the left hand. In spontaneous bimanual writing it is almost impossible for the left hand to write other than mirror-wise. In short the most natural movements of one hand are the mirrored replica of the other. From the psychological aspect the reason why people do not all write mirror-wise with the left hand is that they have learned as a result of experience that European languages arbitrarily read from left to right, consequently mirror-writing at once appears to be incorrect. The faculties of attention, perception and recognition are ever present agencies which check the more primitive "motor complex." Accordingly when these processes are in abeyance, as in conditions of disease or disturbed consciousness, mirror-writing appears.

#### Encephalitis Periaxialis Diffusa.

T. GRAINGER STEWART, J. GODWIN GREENFIELD AND MAJORIE A. BLANDY (*Brain*, March, 1927) refer to the now numerous published cases of *encephalitis periaxialis diffusa* and record the history of three patients observed by themselves. The anatomical picture is more definite than the clinical and as described by Schilder consists of diffuse demyelination of the *centrum ovale*, more or less symmetrical in the two hemispheres and in the majority of instances affecting the occipital lobes at an early stage. Reports of subsequent cases have amplified this picture. In particular, examples have been reported which approximate anatomically to the picture of disseminated sclerosis. In the present report the most important observation on the anatomical side is that the disease is not either necessarily, nor even perhaps usually confined to the *centrum ovale* of the cerebrum, but may affect *pons*, optic nerves and cervical part of the cord. On the clinical side the condition of the majority of affected patients has remained undiagnosed during life. Blindness is perhaps the chief sign and to this, as the cases here recorded show, may be added the important facts that the disease may kill with great rapidity, even in so short a period as nine days and, secondly, that the first symptom may be deafness of central origin. In the differential diagnosis between Schilder's encephalitis and disseminated

sclerosis the chief clinical criteria are the non-remissive nature of the loss of hearing and the progressive and complete loss of vision, both of which pertain to the former.

#### Treatment of Mental Disorders by Injection of Ringer-Locke's Solution.

T. MOROWOKA (*Journal of Mental Science*, April, 1927) has been so impressed by the beneficial effect of saline solution injections in moribund Japanese patients suffering from general paralysis that he has adopted the treatment as a routine measure in all patients admitted to his hospital and in all classes of insanity. In regard to its effect on ordinary general paralytics he states that not infrequently consciousness clears, habits and behaviour improve, seizures disappear, body weight increases and there is all round betterment. Refractory conditions call for the combination of antiluetic treatment with the injections. In the *præcox* group equally satisfactory results may be expected and sufferers from senile, manic-depressive and confusional insanity are undoubtedly improved. The injections are made subcutaneously and it is necessary to use large quantities (five hundred to one thousand cubic centimetres) of the solution (Ringer-Locke) and to make many injections. It appears that the use of these injections has become so widespread in Japan, especially in private hospitals, that many chemists stock five hundred cubic centimetres ampoules of the solution sterilized, oxygenated, sealed and ready for use.

#### Abdominal Tendon Reflexes.

TRIOUMPHOFF, of Leningrad (*Revue Neurologique*, March, 1927) has studied a new abdominal reflex first described by Astvatsatouroff in 1924. The reflex is obtained by percussing the conjoint insertion of the rectus and other abdominal muscles to a point 0.5 to two centimetres lateral to the *symphysis pubis*, when contraction of the corresponding muscles results. The reflex has the advantage of being obtainable on the two sides independently and in the infant appears coincidentally with the well-known cutaneous abdominal reflex. In organic disease the tendon reflex alters correspondingly with the cutaneous reflex. Thus where the integrity of the reflex arcs from the sixth to the twelfth dorsal segment is impaired, as in poliomyelitis, spinal tumour, syringomyelia and so on, both sets of reflexes disappear. In *tabes dorsalis*, however, especially in the early stage, the tendon reflex disappears before the cutaneous reflex. In lesion of the pyramidal tract above the level of the seventh dorsal segment there occurs a parallel abolition of both reflexes on the paralysed side. In disseminated sclerosis while the cutaneous reflex disappears the tendon reflex remains. Biologically and phylogenetically the abdominal reflexes, deep and superficial alike, signify increased tone of the abdominal wall resulting from

assumption by *homo* of the erect position. They are not found lower in the animal scale, not even in apes.

#### Drug Addiction.

L. KOLB (*Journal of Nervous and Mental Disease*, July, 1927) remarks that the relapse of drug addicts is mainly due to the same cause which was responsible for their original fall, namely, a morbid nervous constitution with its inferiorities, pathological strivings and so on from which narcotics give an unusual sense of relief and ease. Another important cause of relapse is the inebriate impulse. Relapse is more frequent now than formerly, because the addiction of relatively normal and therefore more easily curable persons is less frequent. Nearly all addicts make sincere efforts to be cured in the early period of their addiction. Many of the later attempts to find cure are mere matters of expediency and insincere. The hope for cure wanes as time passes and force of habit and numerous impelling memory associations and increasing physical dependency upon drugs are added to the original nervous instability. Physical dependence upon drugs is unimportant as a cause of relapse, when the addiction has been in existence not more than two or three years. In some exceptionally nervous individuals, addicts over many years, withdrawal of the drug may induce hysterical symptoms or hypomania lasting many months. This paper is based on a study of two hundred and ten patients embracing all classes of society.

#### Astereognosis.

E. KOVONOVA (*Encéphale*, July, 1926) holds that the sense of stereognosis is not a function of the brain alone. Two factors take part in its formation; peripherally received impressions of the external details of the object and an intellectual synthesis of the impressions as received by the brain and compared with memories of previous impressions. So it comes about that for the proper exercise of the stereognostic sense integrity of projection and association systems are both necessary; an affection of either will disable stereognosis. This is why astereognosis may arise independently of disorder of elementary or common sensibility. Astereognosis due to severance of association between different centres may be and in fact is commonly accompanied by disorder in this or that form of common sensibility, because sensory and stereognostic centres lie close to one another. A lesion which provokes astereognosis, may simultaneously affect sensory centres by compression or vascular disturbance. The purest forms of astereognosis are provided by head wounds; some such wounds having the sharp definition of an experimentally produced lesion. Accordingly many cases of isolated astereognosis have been recorded. Astereognosis is induced by damage to the lower part of the middle third of the central convolutions, immediately behind and in front of the fissure of Rolando.



## Special Abstract.

### HEALTH AND THE WOOD-WORKING INDUSTRY.<sup>1</sup>

In January, 1926, a request was received by the Minister for Home and Territories from the Federal Council of the Australian Timberworkers' Union for the institution of an inquiry into the injurious effect of dusts from Australian and imported timbers on workers engaged in the timber-working industries. The Council pointed out that in South Australia alone had any research of this nature been carried out and that the results of an inquiry in that State would necessarily be incomplete as far as the whole of the Commonwealth was concerned. It was requested that serious consideration be given to the question in order that any protection that might be given to workers in the timber industry should be of a uniform character.

#### The South Australian Inquiry.

Dr. D. G. Robertson points out that the South Australian inquiry was carried out by Professor J. B. Cleland in 1925. The conclusions arrived at by him were as follows:

1. Fine particles of sawdust are apt to be inhaled into the upper nasal passages producing mild mechanical irritation. The finer and drier the dust, the more likely are the particles to be inhaled.

2. The sawdust from certain woods, especially red pine, rimu and South Australian blue gum are more irritating than others, probably due to some chemical substance aggravating the mechanical action.

3. The effect of the introduction of these wood particles is to give rise to an outpouring of mucus and congestion, probably leading, if long continued, to a certain amount of chronic catarrh. There is no evidence suggesting that the lungs themselves are in any way affected.

4. Though no serious injury to health can be attributed to inhaling any of these sawdusts, the discomfort, irritation, accumulation of mucus, "hawking" and tendency to catarrh, are undesirable, tend to make the individual somewhat less fit to carry on his occupation well and lead to discomfort during his leisure hours. The nuisance should be abated as far as is reasonably possible.

5. Mechanical irritation of the nostrils can be reduced to a negligible quantity by the fitting of effective exhausts.

6. Asthmatic attacks may occur in sensitive people when exposed to the dust of red pine or blackwood. Such individuals should avoid exposure to dust of any kind as far as possible. Suitable X ray treatment reduces the severity of the conditions decidedly, as it does in asthma due to other causes.

7. In occasional cases a dermatitis results from exposure to wood dust, blackwood dust in particular. This is due to a special idiosyncrasy on the part of the patient rather than to a special irritant in the wood concerned. Experiments seem to show that a true blackwood dermatitis can be rapidly cured by suitable X ray exposure and that similar exposures may prevent the dermatitis developing for some while afterwards.

#### The Investigation.

In view of the fact that the Commonwealth Department of Health has no legal powers of entry into factories, the Health and Labour Departments and the employers' organizations concerned in the several States were approached; their consent to the carrying out of the investigation was obtained and their cooperation was promised. Letters were addressed to the secretaries of the State branches of the various unions concerned, asking for particulars in regard to persons who were believed to have been adversely affected by exposure to wood dust. The replies received afforded but little definite information. Only four specific cases supposed to be due to wood dusts were cited and from one State it was reported that no ill-effects had been noted among men working in joinery shops or as

coopers. In order to ascertain the prevalence of nasal, asthmatic and skin troubles in woodworkers questionnaires were addressed to specialists throughout Australia dealing with these conditions. Twenty-four replies were received from ear, nose and throat specialists. When the number of medical practitioners who claim to be expert in this branch of medicine is considered, some estimate may be formed of the way in which specialists are prepared to cooperate with health departments in matters which concern the welfare of the community. Fourteen reported that no cases of nasal trouble due to wood dust had come under their notice. Seven stated that they had observed affected persons, but that the occurrence of such abnormalities was rare. One practitioner from Western Australia reported that 10% of the employees engaged in jarrah mills in that State who came under his notice, suffered from chronic nasal catarrh. One observer stated that nasal trouble was common among woodworkers. Only one practitioner had observed asthma due to wood dusts. The opinion was expressed by specialists reporting nasal trouble that wood dust caused a simple acute rhinitis which persisted as long as the cause remained and which possibly resulted in chronic catarrh. Others were of the opinion that preexisting nasal abnormalities might be aggravated by wood dusts and recommended that exposed workers should have existing nasal defects remedied. A questionnaire was sent to dermatologists. Thirteen replies were received. The dermatologists of the Commonwealth are evidently concerned to the same extent as the rhinologists with cooperation along the lines of preventive medicine. Three stated that they had seen no affected person. The other ten reported that dermatitis due to wood dusts was very rare, but that they had observed them. The lesions observed were described as a papulo-vesicular inflammation of the skin, particularly on exposed parts.

To determine definitely the effects of exposure to wood dusts two hundred and eight woodworkers were examined in Melbourne while they were at work. The examination of the upper air passages was carried out by Dr. E. W. Gutteridge and Dr. S. W. Shields saw all persons who were discovered with lesions of the skin.

#### Nasal Conditions.

The examinees were placed into four groups according to the nasal conditions found. In Group A were placed those in whom no departure from normal health was found. In Group B were placed those in whom there was slight mechanical irritation of the nose arising from the dust inhaled. In these there was an increase of mucin from the muciniferous glands of the nose in response to the irritant action of the fine dust particles. In Group C were placed those men who had some abnormality of the nose or pharynx which had certainly been antecedent to engagement in a wood-working occupation, and to which was due any sign of sinusitis. In Group D were placed those in whom chronic sinusitis of first or second degree was present without causative naso-pharyngeal factor. Sinusitis was regarded as being of the first degree when it was characterized by a muco-purulent discharge with oedema and chronic inflammation of the middle turbinate bones. The more severe sinusitis or that of the second degree was characterized by a constant yellow purulent discharge with polypoid mucous membrane or polypi. Of 208 men examined 130 or 63% were allotted to Group A, 39 or 19% were allotted to Group B, 27 or 13% to Group C and 12 or 5% to Group D. Of the last-named number nine had chronic sinusitis of the first degree and three had sinusitis of the second degree. It will be seen that those of Group B and those of Group D are the only ones who can be looked upon as affected. The total of these groups is fifty-one. Dr. Robertson has classified the total number of persons, 280, into age groups of five periods and calculated the percentages of those affected in each five-year group. While this table undoubtedly makes his statement complete, it does not yield information of great value on account of the smallness of each age group. It is interesting, however, to note that of the twelve persons with chronic sinusitis, eight were in the group of those 36 to 40 years of age.

When the individual establishments examined were considered separately, it was seen that the results were somewhat contrary to expectation. In one establishment,

<sup>1</sup> "An Investigation of Certain Health Aspects in Persons Engaged in the Wood-working Industries," by D. G. Robertson; Service Publication (Division of Tropical Hygiene) Number 4, Commonwealth of Australia, Department of Health.

establishment, Number 8, no attempt was made to exhaust the dust from the air of the workroom and the workers were exposed to an atmosphere containing a very visible amount of fine Californian red pine dust and yet only two of the fourteen workers manifested signs of irritation. In other establishments in which effective systems of exhaust were in operation, the number of men affected was below, about and above the average for all the men examined. In establishment Number 10 where considerable effort had been made to make the place as free from dust as possible, five of the twenty-eight employees examined showed signs of mild nasal irritation and one suffered from chronic sinusitis. The explanation of the finding that the provision of efficient exhausts did not appreciably lessen the incidence of nasal trouble lies in the fact that in these establishments practically every person examined was engaged in operating wood-working machines. Further their length of service was higher than in other establishments. At the same time it was found when the totals were analysed that a greater percentage of examinees manifested evidence of mechanical irritation in establishments not provided with exhausts or in those in which exhausts were deficient. It is pointed out that exhausts have been installed only during the last few years and that many men have for years been exposed to inhalation of wood dust. Of the machinists no fewer than 40% gave evidence of nasal trouble due to dust.

In regard to the types of timber with which the men had worked, it was found that very few had worked with one particular type of timber only. A list of the different types of timber used is given and reference is made to the article by Professor J. B. Cleland dealing with plants injurious to man, published in THE MEDICAL JOURNAL OF AUSTRALIA on October 10, 1925.

In the replies to the questionnaire sent to ear, nose and throat specialists, various recommendations were made regarding prophylactic measures that might be taken, such as the application of vaseline to the nares, spraying the nose with paraffin solutions, the wearing of respirators, douching the nose after work, but Dr. Robertson expresses the opinion that it would be very difficult to enforce these measures in practice. He holds that the only practical solution is to minimize the exposure of the worker to the fine sawdusts by the provision of efficient ventilating systems which extract the dust from the air of the room at the source of origin.

#### Aural Conditions.

One hundred and thirteen men were submitted to aural examination. In 75 or 66% no abnormal ear conditions were detected. In twelve persons the presence of cerumen was noted and in one of these retraction of the ear drum and deafness, in one retraction of the ear drum and in another deafness were also recorded. In seven other examinees deafness to a more or less degree was observed. Retraction of the ear drum with or without sclerosis was noted in fifteen other persons and perforation of the ear drum and *otitis media* were each found in one person. Two men complained of tinnitus. Ear abnormalities were found in 31% of examinees working with exhaust systems and in 35% of those working with no exhaust. When the ear symptoms were compared with the groups of nasal conditions, it was found that ear abnormalities were present in 32% of those in Group A, in 42% of those in Group B, in 27% of those in Group C and in 50% of those in Group D.

#### Asthma.

Two persons only of the whole number gave a history of asthma. In both instances it was doubtful whether the asthma was in any way due to the nature of the employment.

#### Bronchitis.

Two persons gave a history of bronchitis. One of these had suffered since childhood and the other was found to have infected tonsils.

#### Dermatological Conditions.

Only one man of the whole 280 was found to be affected by dermatitis. Ten others, not included in the series were discovered and they are included in this section of the

report. One of the ten suffered from urticaria and nine from dermatitis. The condition of all was regarded as occupational. In this connexion reference is made to Cleland's conclusions in regard to susceptibility.

#### Recommendations.

Dr. Robertson's recommendations are as follows:

1. In view of the large percentage of wood workers found affected with nasal trouble, definitely due to the inhalation of wood dust, it is strongly urged that these workers be adequately protected by the installation of an effective exhaust on each wood-working machine, so that the quantity of wood dust liberated into the air of the workroom be minimized as far as possible.

2. Susceptible persons suffering from a dermatitis due to working with blackwood or other timbers cannot reasonably expect to be cured without cessation of this work and removal from exposure to the cause of their dermatitis. It is recommended that this question be taken into serious consideration with the object of providing in some effective way for the small number of persons with this peculiar susceptibility.

## British Medical Association News.

### SCIENTIFIC.

A MEETING OF THE SOUTH AUSTRALIAN BRANCH OF THE BRITISH MEDICAL ASSOCIATION was held at the Darling Building, Adelaide University, on August 25, 1927, Dr. R. H. PULLEINE, the President, in the chair.

#### Uterine Hæmorrhage.

Dr. J. BERNARD DAWSON read a paper entitled: "Menstrual Bleeding and the Functions of the *Corpus Luteum*" (see page 496).

Dr. RUPERT MAGAREY read a paper entitled: "The Causes and Treatment of Excessive Uterine Hæmorrhage at or About the Menopause" (see page 504).

Dr. ROLAND BEARD in congratulating Dr. Dawson on his paper, said that in support of the view that ovulation preceded menstruation were the recorded observations that pregnancy had occurred before menstruation had been established. In one instance known to him a family had been reared and the mother had never menstruated. He wished to refer to only a few of the important causes of uterine hæmorrhage during the reproductive period which were unconnected with pregnancy. Among these were acute and chronic endometritis, retroversion of the uterus, uterine fibroids, endometrioma, uterine cancer, sarcoma, chorion epithelioma, acute and chronic pelvic infections and chronic metritis. He also pointed out some of the causes of uterine bleeding at various periods of menstrual life. In childhood hæmorrhage might owe its origin (i) to a precocious onset of menstruation or (ii) to malignant disease, such as sarcoma of the cervix or ovary. In adolescence profuse hæmorrhage might be noticed during the first few periods and a menstrual loss might be so excessive as to exsanguinate the patient. At this time also malignant growths of the uterus or ovary might occur. In the later period of reproductive activity hæmorrhage might be caused by (i) fibroid tumours, including polypi, (ii) chronic metritis and conditions of that group, (iii) pelvic inflammatory lesions, (iv) malignant growths of the uterus. In the later stage of reproductive life cancer should be carefully sought. A diagnostic curettage was often a wise precaution. It was important also to remember the comparative frequency with which carcinoma of the body of the uterus accompanied uterine fibroids. Hence when a uterus was removed for fibroids by subtotal hysterectomy, it should be opened up and cancer should be excluded before the intraperitoneal operation was completed. It was lamentable also to find so often malignant growths of the uterus at a stage too late for effective surgery. The patients were frequently healthy in other respects. They were too young to die. One means of combating this difficulty was a systematic prophylactic

examination of the pelvis of middle-aged women. The breasts should be examined at the same time. With regard to bleeding due to the chronic metritis group, *fibrosis uteri*, this was a common cause in middle age and often yielded promptly to radium application, when malignant disease was excluded and inflammatory complications, such as severe cervicitis and pelvic inflammation, were absent.

Dr. Beard referred to the value of radium treatment in the profuse hæmorrhage sometimes associated with early menstruation. He referred to a patient who had been treated recently by Dr. T. G. Wilson at the Adelaide Hospital. The patient, aged fourteen years, had menstruated profusely at her third period with the passage of clots for twelve days. Her second period had been profuse. Her condition had been very low. The uterus had been curetted and three hundred and sixty milligramme hours of radium applied. The patient's condition had rapidly improved. Successive menstrual losses had so far been normal.

Referring to the new terms suggested in Dr. Dawson's paper to cover hæmorrhage at various periods of the menstrual cycle, he thought that simplicity of terms was preferable and the time-honoured terms, menorrhagia and metrorrhagia, were still too useful to be lightly discarded. He agreed with Dr. Rupert Magarey's suggestion as to the value of packing in the treatment of hæmorrhage due to abortions, but thought that the packing must not be left in too long.

Dr. T. G. WILSON congratulated Dr. Dawson on the excellent résumé of the most recent knowledge as regards the factors controlling menstruation and said that from a practical point of view such a résumé of present knowledge was an excellent opening paper for a discussion such as was proposed that night. It was a rare thing for gynaecologists, called on to treat irregular menstrual bleedings, to keep in mind the factors which were likely to control such bleedings.

In regard to the papers of Dr. Magarey and Dr. Beard he wished to discuss only one or two things, mostly from the point of practical treatment. He was glad to hear the remarks of Dr. Magarey and Dr. Beard about the use of radium, as he had come to the conclusion that radium had a definite place in the armamentarium of the gynaecologist and especially in the treatment of profuse bleedings, occurring either at the beginning or at the end of the menstrual life of woman. He recalled a number of cases in quite young women who had suffered from profuse menorrhagia, and in some cases to such a severe extent that before the use of radium or X rays there was no alternative but the removal of the uterus. At the present time such a tragedy as this could be averted by the use of radium and in severe cases he would not hesitate to use it, even though he knew that some authorities had suggested that radium might have the effect of causing abnormalities should pregnancy take place later.

And in regard to cases of excessive bleeding at the time of the menopause, in cases in which new growths had been excluded and in which there was no other disease present, his experience with radium had been very satisfactory. The same applied to a large proportion of fibroids, uncomplicated by adnexal or inflammatory trouble. In these cases it was possible to give with safety a bigger dosage than would willingly be risked in a young woman, as a permanent amenorrhœa did not matter very much.

In regard to Dr. Magarey's remarks as to whether the radium acted directly on the uterine walls or secondarily by the effect on the ovary, he cited the following case. An unmarried woman of thirty-six had been sent into hospital with excessive bleeding and a diagnosis of fibroid of the uterus. Under ether anaesthesia she had been found to have a large floppy uterus which felt to be the size of a closed fist. No fibroid had been palpable. Exploration of the uterus had failed to disclose any polypus or evidence of fibroids or new growth. She had been given twelve hundred milligramme hours of radium. Exactly three weeks later she had been sent back to the hospital, having had a most severe flooding and her general condition had confirmed this. Although he realized that this result followed the use of radium at times for the first period or two, he had decided to remove the uterus. This had been done by supravaginal amputation and to his surprise at the operation he had found a definitely small uterus, about

the size that would be normal after the menopause. The ovaries had appeared quite normal. On cutting through the uterus he had found a small intramuscular fibroid at the fundus, the size of an ordinary marble, and this had had a definite hæmorrhage in its substance. Dr. Bull had reported that sections of the uterus manifested a slight degree of fibrosis. In this case he was positive that the uterus had definitely shrunk in size in the period of three weeks. He regretted he had not removed one ovary at any rate, in order that it might have been submitted to microscopical examination. This case seemed to suggest that the effect of the radium had definitely caused a decrease in the size of the uterus.

In regard to the use of the various terms for abnormal bleeding he thought that the two terms menorrhagia and metrorrhagia were applicable to the condition found and he was accustomed to use only these two terms in teaching students.

Dr. BRIAN SWIFT thanked Dr. Dawson for his paper and brought up the subject of the relation of the *corpus luteum* of pregnancy to the pituitary. Dr. Dawson had said that the death of the *corpus luteum* allowed the pituitary to act and that labour was the result. If this were the case then any removal of the *corpus luteum* of pregnancy would result in abortion or miscarriage. This was not the case, as numerous operations had been done for removal of ovarian tumours during pregnancy and the *corpus luteum* also had been removed, but the patient had not had a miscarriage. The present day theory was that the placenta acted as a storehouse for the *corpus luteum* hormone and that it took on its function after the third month of pregnancy. If therefore the *corpus luteum* of pregnancy was removed before the third month, then the woman would abort, but not so after the third month. It was also thought that the mammary gland and lactation acted in the same way and so menstruation did not take place during lactation.

With regard to Dr. Magarey's remarks on the treatment of hæmorrhage in young women by radium, Dr. Swift was sorry that he had not stated whether he considered that the radium acted on the ovary or on the uterus. If it acted on the ovary, then growing follicles would be affected in just the same way as they were when the ovary was radiated with X rays. It had been proved that X rays had a harmful effect on the ovum and that if the ovum became fertilized, then there was a risk that the resulting child would be born with some abnormality. Dr. Swift thought that before resorting to this dangerous form of treatment, the spleen should be examined to see if it were enlarged and even if there was no enlargement, that it should be irradiated by X rays. The theory of this radiation was that leucocytes were broken down and so more thrombo-kinase was formed, also that some of the spleen tissue was killed and so the number of platelets remaining in the circulation was greater. Dr. Swift said that numerous cases of cure had been published and he advocated that only after radiation of the spleen should radium be used.

Dr. R. F. MATTERS said that he too wished to thank those who had so ably presented the papers. He also wished to comment on some of the remarks.

In support of Dr. Dawson's luteal theory Dr. Matters recalled a statement of Weible wherein he contended that sometimes the *corpus luteum* remained as a cyst and that the luteal influence was still maintained on the endometrium, so that the decidua was not extruded, but amenorrhœa eventuated. Subsequently the engorged endometrium developed hæmorrhages so that vaginal bleeding was noted. This condition which was rare, had to be distinguished from ectopic gestation.

He went on to remark that Adler who first described the menstrual cycle, had introduced a contradictory note. He had removed recent *corpora lutea* in some cases, while in others he had removed only old *corpora lutea*, leaving the recent *corpus*. He suggested that the menstruation followed ovarian initiation. It had been known that pregnant women with prolapsed ovaries had aborted following coitus.

Dr. Matters referred to the remark of Dr. Magarey that influenza was a common extragenital cause of menorrhagia,



but he thought that most pyrexial conditions brought about the same result.

He also referred to the remark that bulky cervixes often caused menorrhagia. Here, he suggested that radium in needles of about two milligrammes inserted in a ring round the periphery of the cervix, would save cervical amputation and produce that fibrotic condition spoken of by Dr. Wilson. The menorrhagia following the use of radium for the first or second ensuing periods was probably due to stimulation of the ovary by the radiation.

Dr. D. R. W. COWAN asked for information. He had recently seen a young married woman with a babe three months old and she had given the following history. Ten years previously at the age of twenty years she had had a hæmorrhage from the lungs. Hæmorrhages had recurred at intervals of a few months until three years previously, since that time she had had no further bleeding from the lungs. A consultant on North Terrace who saw her a few years previously had diagnosed her condition as one of vicarious menstruation, and in this diagnosis the local practitioner had concurred. For three months she had had cough and expectoration in which tubercle bacilli were present. Dr. Cowan asked for information as to whether such a condition as vicarious menstruation ever occurred. If so, did it ever occur from the lungs; and if so, did the condition predispose to the subsequent development of pulmonary tuberculosis.

Dr. BEARD in reply said that he often noticed excessive bleeding after removal of an ovary and wondered whether it was due to the quantitative reduction of the ovarian secretions. The action of radium varied in different individuals and he suggested that action on the ovary, if any, might have some dependence on the position of the ovaries—whether displaced by old adhesions nearer the uterus or slung further out in a more normal position. He wished to explain that the cases of chronic metritis benefited by radium were those due to subinvolution without accompanying inflammatory lesions.

Dr. RUPERT MAGAREY, in reply, said that he was very interested to hear of Dr. Wilson's case, for it tended to prove the view he had always held that radium produced its effect by action on the uterus and not on the ovaries. It seemed to him only reasonable to suppose that this was so. The radium container was completely surrounded by the uterus and the ovaries were comparatively some distance away. Herein was the great difference between radium and X ray treatment. In the latter the rays were directed at and focussed on the supposed site of the ovaries.

With reference to Dr. Beard's report of the young girl of fourteen years of age in Dr. Wilson's ward, he (Dr. Magarey) thought the dose was too big. He thought this girl was quite likely ultimately to develop oligomenorrhæa. He himself was tending to use smaller and smaller doses especially in women under thirty.

In reply to Dr. Swift, he had always very carefully examined these young girls before submitting them to radium treatment and he felt sure that he had not missed any case of enlarged spleen which could be discovered by palpation or percussion. In some of them he had had blood examinations made, but he admitted that he had not had blood platelets counted. He would be interested to find such a case. But these girls were absolutely inviolated by their excessive loss, their life was a misery and something had to be done and he had found that radium had been of immense benefit. He did not believe that the small dose which he used, two hundred milligramme hours or less, would produce the dire results on the possible offspring which had been mentioned by Dr. Swift. With reference to this question, there was an article in a recent number of *Surgery, Gynecology and Obstetrics* reviewing the cases treated by radium in Graves's clinic in Chicago and the conclusions drawn were that the women appeared to be quite as liable to conceive, but slightly more liable to miscarry than untreated women. The offspring was apparently healthy.

Dr. DAWSON in reply to Dr. Cowan said that he was afraid that he did not know any more about vicarious menstruation than Dr. Cowan. The belief in the manifestation had the sanctity of age, being mentioned in Egyptian papyri, in the Hippocratic writings, by the Arabian physicians and by Rabelais. He did not personally believe in it and regarded it as a legacy from the middle ages.

He suspected that Dr. Cowan's case of reputed vicarious menstruation from the lungs probably had been characterized by a tuberculous lesion from the onset.

In reply to Dr. Brian Swift, Dr. Dawson stated that the whole question of the influence of the *corpus luteum* and other ovarian structures bristled with difficulties and contradictions. It was, however, necessary to try to construct a consecutive story, even if positions taken up had to be abandoned later.

It had to be borne in mind that the life cycles of *corpora lutea* overlapped and that even after removal of the recent *corpus luteum* there was possibly old and still active lutein tissue in the ovaries which in some cases might exert a continued lutein inhibition upon other ovarian endocrines.

Replying to Dr. Magarey, Dr. Dawson said he agreed and meant to convey in his paper that simplicity of nomenclature of uterine hæmorrhage was most desirable, but that he thought there was need for a new term to define too frequent periods of normal duration and loss. He thought that the word epimenorrhæa met this case.

A MEETING OF THE NORTHERN DIVISION OF THE TASMANIAN BRANCH OF THE BRITISH MEDICAL ASSOCIATION was held at the Launceston Public Hospital, Launceston, September 8, 1927. Dr. C. G. THOMPSON occupied the chair.

#### Sarcoma of the Orbit.

Dr. C. CRAIG presented a case of sarcoma of the orbit. The man, aged sixty-one years, had presented himself for examination some months previously with a hard swelling in the right parotid region which had the characteristics of a malignant tumour. Radium had been applied and the mass had become much smaller. A few weeks previously he had again come into hospital. On this occasion it had been noticed that his right eye was bulging out and movement in it was greatly limited; sight was gone. X ray examination revealed gross irregularity of the bone forming the upper and posterior wall of the orbit. One week previously the left parotid had suddenly become swollen.

Dr. J. RAMSAY said that in Frankfurt he had seen excellent results in the treatment of tumours of bone by the application of X rays.

Dr. W. P. HOLMAN suggested the use of Coley's fluid.

Dr. G. E. CLEMONS said that the enlargement of the parotid was no doubt due to involvement of the lymphatic glands and blockage of the ducts of the parotid. He suggested the possibility of carcinoma.

#### Paralysis of the Ulnar Nerve.

Dr. Craig then presented a case of partial paralysis of the ulnar nerve following a fracture of the humerus. The lower end of the humerus had been fractured six months previously. Immediately after the injury, the girl, aged seventeen years, had noticed tingling along the ulnar border of the hand. She had noticed soon afterwards some loss of power in the hand and wasting of the hypotenar muscles. The wasting had progressed slowly. The most noticeable features on examination were wasting of the hypotenar muscles, abduction of the little finger and loss of all forms of sensation over the two distal phalanges of the little finger. An incision had been made down to the nerve. The ulnar groove had been filled with callus over which the nerve rode easily without any involvement in the callus. The nerve had been dissected to one side. Since the operation two weeks previously she had had more power in the hand and sensation was returning to the little finger.

Dr. J. RAMSAY said he had frequently had evidence that mere pressure on the nerve by callus was sufficient to produce a partial paralysis.

#### Œsophageal Diverticulitis.

Dr. Ramsay then showed a woman, aged sixty-one years, who was suffering from Œsophageal diverticulitis. Three years previously she had complained of difficulty in swallowing. Then she had experienced a choking sensation. Over one year previously she had begun to get regurgitation, either immediately or half an hour after taking food.

Then she had become able to press the food back. Dr. Ramsay showed the skiagram of the sac. He gave a brief summary of the origin and development of such sacs.

In discussing the operative treatment, he said he was strongly in favour of the two-stage operation. In the first stage the sac was delivered and the neck sewn to the skin. In the second stage the body of the sac was removed. Operation in one stage was often followed by acute mediastinitis.

#### Cervical Rib.

Dr. Ramsay then showed an X ray photograph of a patient who had come to him, complaining of some pain in the arm. The skiagram revealed an unusually long cervical rib.

### NOMINATIONS AND ELECTIONS.

THE undermentioned has been nominated for election as a member of the New South Wales Branch of the British Medical Association:

Cardamatis, Constantin John, M.D., 1927 (Univ. Athens), "The examination prescribed by the Senate of the University of Sydney" [*Medical Practitioners Act, 1912-1915; Section 4 (3)*], 23, Challis Avenue, Potts Point, Sydney.

## Special Correspondence.

### LONDON LETTER.

BY OUR SPECIAL CORRESPONDENT.

#### Post-Graduate Work in London.

It is difficult to realize, while writing these notes in the Old Country, that they will not be read in Australia until some six weeks have elapsed and that it is therefore of little use to comment on forthcoming events in the comparatively near future. As far as post-graduate work is concerned, therefore, the briefest mention and that merely from the point of view of interest is all that need be made of opportunities available before Christmas. It will suffice to say that as the medical year begins in October, there will be a full curriculum from then until Christmas. Post-graduate courses on all subjects will be held at the London hospitals, while lectures and clinical demonstrations during that period are already arranged by the University, the Royal Colleges (of Physicians and of Surgeons), many of the hospitals and societies and last but not least by the Fellowship of Medicine.

During the Christmas period the work is naturally curtailed, but early in January a full programme will again begin. One of the courses which has proved the most popular with post-graduates, is that which is given thrice yearly at the National Hospital for Diseases of the Heart, the first course taking place in January and occupying mornings and afternoons for two weeks. Comprehensive theoretical and practical instruction is given by means of lectures and demonstrations in the wards and out-patient department. The number of post-graduates attending the course is limited to twenty and the fee is seven guineas. Another interesting and instructive course is that to be given at the North-East London Post-Graduate College (Prince of Wales's Hospital) for two weeks. A very full syllabus is arranged which will keep the post-graduate well occupied from 10.30 a.m. to 5.30 p.m. daily with lectures and demonstrations in all branches of medicine, surgery and the special departments. The fee is five guineas. Other courses to be given during January are one in children's diseases (for two weeks, fee two guineas) and one in psychological medicine at the Bethlem Royal Hospital (Tuesdays and Saturdays, fee one guinea).

Lectures arranged by the various institutions and clinical demonstrations in medicine, in surgery and in ophthalmology, taking place at the appropriate hospitals, will also be available during January and the following months. All particulars, syllabuses, fees, tickets and so

forth are obtainable from the Fellowship of Medicine, No. 1, Wimpole Street, London.

#### Visits to London.

A small party of Canadian and American doctors recently arrived in this country on a visit to the various medical centres and naturally London was included in their itinerary. The Fellowship of Medicine undertook to arrange a programme for these visiting doctors consisting of a series of lectures and special clinics at various hospitals. We would suggest that parties of Australian doctors also visit the mother country for whom the Fellowship of Medicine would be delighted to organize a programme of interest. Distance is, of course, a great drawback, but it is possible that such a tour could be undertaken by those doctors who are desirous of visiting London for post-graduate study.

#### The Pathology of Intestinal Obstruction.

A great deal of interest has been aroused by some work which is being done at St. Thomas's Hospital by Mr. B. W. Williams. Noticing the resemblance between the closing picture in cases of intestinal obstruction, diffuse peritonitis and gas gangrene, Mr. Williams decided to investigate the possibility of these symptoms being all due to a similar toxin and his investigation has led him to believe that the *Bacillus welchii* which is a normal inhabitant of the intestinal tract, was present in great excess in the vomit and in the intestinal contents in both intestinal obstruction and peritonitis. Further investigations show that the symptoms are due to a toxin and he proceeded to treat a series of patients with an appropriate serum. This treatment has been attended by very remarkable improvement in the results. During two years the mortality among patients with intestinal obstruction has been reduced from 24.8% to 9.3% and that among patients suffering from acute appendicitis from 6.30% to 1.17%. Mr. Williams maintains very large doses are necessary and suggests the minimum 80 cubic centimetres administered either intravenously or subcutaneously as an initial dose followed by a further 40 cubic centimetres each day until the symptoms subside. The serum used contained *Bacillus welchii* and *vibrio septique* antitoxins. If these findings are substantiated on further investigation, a great advance will have been made as the cause of ileus has been little known and treatment has been comparatively ineffectual.

## Public Health.

### THE CONFERENCE ON INDUSTRIAL HYGIENE.

(Continued from page 315.)

THE conference had before it a report on the various industrial medical services in the Commonwealth. It is pointed out that the majority of industrial firms have still to be persuaded that it is sound economy to pay full regard to the health and comfort of those employed. The objects of the employment of medical officers and nurses are to insure that undue fatigue is avoided, that the working environment is rendered as comfortable as possible and as hygienic as possible, that prompt and efficient medical and surgical aid is available in emergency. It is estimated that there are seven hundred factories at which more than one hundred workers are employed. It is contended that if the advantages in increased production as well as more willing cooperation were explained to the employers, more large establishments would appoint a medical officer either as a whole time officer or as a whole-time officer to a combination of several firms.

Dr. Kate Mackay, Medical Officer of the Department of Labour in Victoria, had drawn attention to the need for dental treatment, especially of children. She found that over 90% of female children fourteen years of age had severe dental defects. These children had been given permission to work on account of the poverty of their parents. The Electrolytic Zinc Company in Tasmania had found that the lessened insurance claims had been a

material set off against the expense of the industrial dental clinic which had been organized on the premises of the company. This clinic had been supported by a subsidy from the company and payments from the employees' insurance fund. In regard to eye defects Dr. Mackay had recorded as her opinion that 10% of six hundred children aged fourteen years seeking permission to enter factories had definite ocular defects. She had required forms to be filled in before the permission was granted as was done by the Education Department. The form had to be signed by an ophthalmic surgeon treating the children at the Eye and Ear Hospital or at the ophthalmic department of a general hospital. The honorary medical officers were refusing to sign the forms. She held the opinion that children seeking permission to work in factories should be examined thoroughly and that the ophthalmic examination should be undertaken by a competent ophthalmic surgeon.

Some highly interesting proposals have been put forward in connexion with the precautions to be taken in the manufacture and use of paints by a committee appointed by the Australian Commonwealth Engineering Standards Association. The committee comprised Dr. D. G. Robertson, Director of Industrial Hygiene, Commonwealth Department of Health, Professor Chapman, Dr. Charles Badham, Dr. S. A. Smith, representatives of the manufacturers and users of paints and a representative of the Trades Union. The committee recommended that for interior painting of buildings lead containing substances should not be used except in the form of paste or paint ready for use. Lead paint should not be stored, transported or used unless in receptacles legibly marked with the percentage of lead contained. Lead paint should be used in the form of a spray in the interior painting of buildings. Surfaces painted with lead paint should not be rubbed down or scraped by a dry process. The application of lead paint by the bare hand should be forbidden. While wet rubbing down and wet removal of paint was recommended, it was realized that this was not always practicable. Under certain circumstances it was permissible to burn off the paint. Suitable overalls and head coverings should be worn during working hours by painters using lead paints. These should be kept clean. Where dust containing lead in dangerous amounts was unavoidable, respirators should be worn. Proper facilities and materials for the effective washing of the hands, arms and face should be provided. Wholesome drinking water should be available for all workers. When lead poisoning occurs among the employees of any firm, a thorough investigation should be made to disclose the cause or causes. Similar recommendations with slight modifications were made in connexion with exterior painting of buildings. A special set of rules was drawn up for the special case of painting of articles for sale. In regard to the painting of ships, burning off and chipping was regarded as inevitable under certain conditions. The recommendations to apply to spray painting included the following: Lead should not be used for interiors. Non-lead paints should be given preference for spray work under all circumstances. Properly constructed booths should be provided with efficient ventilation. The form of booth, the method of exhaust system of ventilation, the size and means of maintenance of booths are prescribed. In the next place the committee deprecates the use of benzol as a solvent. Shellac dissolved in wood alcohol or wood alcohol in any other form is also proscribed. All containers of paint removers composed of benzol, carbon bisulphide or methyl alcohol should be properly labelled and attention should be called to the fact that these substances are dangerous to health. A set of common sense regulations was added to be observed by employees.

The conference further considered the measures that could be taken to reduce wastage resulting from industrial accidents, the advisability of excluding from mines and quarries all persons suffering from tuberculosis and the practicability of extending hygienic rules to offices. After full consideration of all the facts and reports the members adopted the following resolutions.

1. That the previous resolutions dealing with the standards of qualification for factory inspectors be reaffirmed.
2. That all accidents occurring in factories reported to the Chief Inspector of Factories in the State concerned

should be incorporated in the Annual Report of the Chief Inspector of Factories in the form of statistics as recommended by the International Conference of Labour Statisticians, Geneva, 1923.

3. In view of the importance of uniformity in respect of both administration and statistics it be a recommendation to all Governments that the necessary statutory amendments be adopted to provide that any accident which (a) causes loss of life or (b) incapacitates from work for more than twenty-four hours be reported.

4. This conference affirms the desirability of a general investigation into hygienic standards in factories and the practical application of such standards, particular attention being paid to the result of the work already done by Dr. Badham in the regulating of atmospheric conditions in factories and that the Division of Industrial Hygiene be asked to carry out in association with the State authorities such an investigation.

5. This conference recommends that a survey of female labour in industry in Australia is desirable and this conference recommends that such a survey be undertaken by the Division of Industrial Hygiene in cooperation with the State authorities, the results of this survey being reported to the next conference.

6. The departments concerned undertake to make inquiries into the subject matter of the communication from the International Labour Office, Geneva, regarding medical inspection in unhealthy industries and to bring forward information at the next conference.

7. This conference places on record its conviction that interchanges of official visits between officers concerned with any phase of industrial hygiene are highly desirable and should be encouraged whenever practicable.

8. This conference resolves that Resolution 13 of the conference of 1922 be reaffirmed and that information as to progress in the establishment of industrial medical services in each State should be prepared for the next conference.

9. In relation to Resolution 3 of the Conference of 1924, this conference considers that under special circumstances exemption may be made by the Chief Inspector of Factories in specific industries in cases where such lifting or carrying is intermittent.

10. It is considered by this conference that the industrial importance of the correction of visual defects and the value to the general health of the correction of dental disorders justify the encouragement of the authorities of arrangements for these purposes.

11. This conference, after consideration of the recommendations made by the Special Committee to the Australian Commonwealth Engineering Standards Association, approved of the principles contained therein and recommended them to the attention of the Departments concerned.

12. This conference resolves that a committee consisting of Drs. O'Reilly, Badham, Robertson, and Mr. W. I. Taylor be requested to investigate the question of industrial accidents amongst minors employed in factories, enlisting the assistance of the other members of this conference. This committee is requested to report to the next conference or to circulate their report if completed before the next conference.

13. This conference considers that in each State legislative action should be taken to exclude from industries in which there is exposure to phthisis-producing dust employees suffering from active pulmonary tuberculosis and to provide compensation.

14. This conference considers that there is urgent need for applying the established principles of industrial hygiene to the clerical workers in offices and departments and commends to the consideration of the departments concerned the provisions of the *Offices Regulation Bill* introduced into the House of Commons in 1926.

#### THE SISTER MARSDEN TESTIMONIAL FUND.

THE Honorary Treasurer of the Sister Marsden Testimonial Fund (see THE MEDICAL JOURNAL OF AUSTRALIA,



September 10, 1927, page 382) has received the following contributions. It is hoped that others who have benefited by the guidance and help of Sister Marsden in the past, will show their appreciation of this by assisting the organizers of the fund to provide a home for her.

	£	s.	d.
Nurse Nelson .. .. .	2	2	0
Dr. P. T. Thane .. .. .	2	2	0
Dr. B. W. Stevenson .. .. .	2	2	0
Dr. N. D. Barton .. .. .	1	1	6
Miss Mary Alcorn .. .. .	1	1	0
Dr. H. W. Chenhall .. .. .	1	1	0
Dr. K. C. Cunningham .. .. .	1	1	0
Miss L. B. Godfrey .. .. .	1	1	0
Dr. F. S. Hansman .. .. .	1	1	0
Miss I. B. Lavarack .. .. .	1	1	0
Mrs. Murray Will .. .. .	1	1	0
Dr. Maisie Asher .. .. .	1	0	0
Miss Beatrice Gardner .. .. .	1	0	0
Miss H. M. Loxton .. .. .	0	10	6
Miss Mabel Buckley .. .. .	0	10	0
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Miss F. McLean .. .. .	0	5	0
Miss A. L. Meissner .. .. .	0	5	0

Total amount received to date .. .. . £19 5 0

#### TRANSACTIONS OF CONGRESS.

OWING to unusual congestion of work in The Printing House it has been necessary to postpone the publication of the tenth supplement containing Transactions of the Australasian Medical Congress (British Medical Association), Dunedin, 1927, second session, for a fortnight. The tenth supplement will be issued with THE MEDICAL JOURNAL OF AUSTRALIA of October 29, 1927.

#### Diary for the Month.

- Oct. 11.—Tasmanian Branch, B.M.A.: Branch.  
 Oct. 11.—New South Wales Branch, B.M.A.: Ethics Committee.  
 Oct. 12.—Central Northern Medical Association, New South Wales.  
 Oct. 13.—Victorian Branch, B.M.A.: Council.  
 Oct. 13.—New South Wales Branch, B.M.A.: Clinical Meeting.  
 Oct. 14.—Queensland Branch, B.M.A.: Council.  
 Oct. 17.—New South Wales Branch, B.M.A.: Organization and Science Committee.  
 Oct. 18.—Tasmanian Branch, B.M.A.: Council.  
 Oct. 18.—New South Wales Branch, B.M.A.: Executive and Finance Committee.  
 Oct. 19.—Western Australian Branch, B.M.A.: Branch.  
 Oct. 21.—Eastern Suburbs Medical Association, New South Wales.  
 Oct. 25.—New South Wales Branch, B.M.A.: Medical Politics Committee.

#### Medical Appointments.

Dr. E. C. Dean (B.M.A.) has been appointed an Examiner to the Midwives' Registration Board, Western Australia.

#### Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, locum tenentes sought, etc., see "Advertiser," page xviii.

ALFRED HOSPITAL, MELBOURNE: Honorary Physio-Therapist.

AUSTIN HOSPITAL FOR CHRONIC DISEASES, HEIDELBERG, VICTORIA: Honorary Physician.

#### Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCH.	APPOINTMENTS.
	Australian Natives' Association. Ashfield and District Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Leichhardt and Petersham Dispensary. Manchester United Oddfellows' Medical Institute, Elizabeth Street, Sydney. Marrickville United Friendly Societies' Dispensary. North Sydney United Friendly Societies' People's Prudential Benefit Society. Phoenix Mutual Provident Society.
NEW SOUTH WALES: Honorary Secretary, 30-34, Elizabeth Street, Sydney.	
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries Australian Prudential Association Proprietary, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane.	Members accepting appointments as medical officers of country hospitals in Queensland are advised to submit a copy of their agreement to the Council before signing. Brisbane United Friendly Society Institute. Sfannary Hills Hospital.
SOUTH AUSTRALIAN: Secretary, 207, North Terrace, Adelaide.	All Contract Practice Appointments in South Australia. Booleroo Centre Medical Club.
WESTERN AUSTRALIAN: Honorary Secretary, 65, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.
NEW ZEALAND (WELLINGTON DIVISION): Honorary Secretary, Wellington.	Friendly Society Lodges, Wellington, New Zealand.

Medical practitioners are requested not to apply for appointments to positions at the Hobart General Hospital, Tasmania, without first having communicated with the Editor of THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, New South Wales.

#### Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

All communications should be addressed to "The Editor," THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, Sydney. (Telephones: MW 2651-2.)

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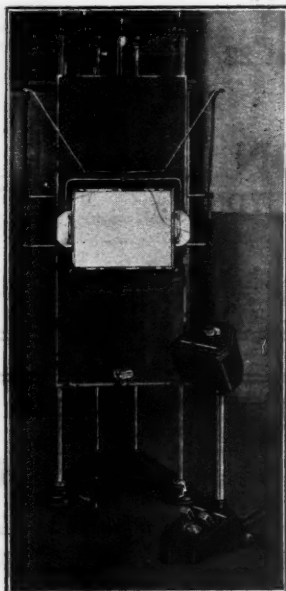
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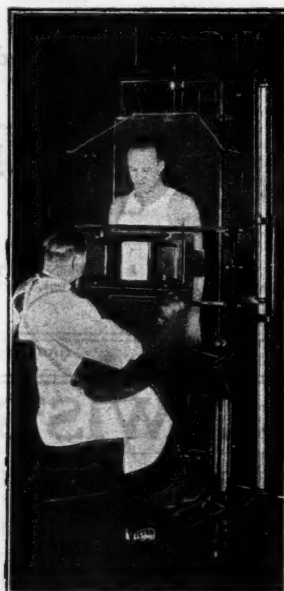
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